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TRANSPORTATION SCIENCES CENTER
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Division of Calspan SRL Corporation
[redacted] New York [redacted]

CALSPAN ON-SITE AIR BAG DEPLOYMENT INVESTIGATION
CALSPAN CASE NO. 95-22
VEHICLE: 1995 SATURN SL1
LOCATION: LOUISIANA
DATE: [redacted]1995

Contract No. DTNH22-94-D-07058

Prepared for:

U.S. Department of Transportation
National Highway Traffic Safety Administration
Washington, D.C. 20590

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The crash investigation process is an inexact science which requires that physical evidence such as skid marks, vehicular damage measurements, and occupant contact points are coupled with the investigator's expert knowledge and experience of vehicle dynamics and occupant kinematics in order to determine the pre-crash, crash, and post-crash movements of involved vehicles and occupants.

Because each crash is a unique sequence of events, generalized conclusions cannot be made concerning the crashworthiness performance of the involved vehicle(s) or their safety systems.

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On-site investigation of an intersection crash that resulted in deployment of the Saturn's driver and passenger side air bag system and subsequent death of the infant right front occupant.

16. *Abstract*

This on-site investigation focused on a two-vehicle intersection-type crash that resulted in the death of a 4 month old infant male. The infant was secured in a rearward facing Evenflo Joyride infant restraint that was positioned in the right front of a 1995 Saturn SL1. The Saturn was equipped with driver and passenger side air bags which deployed as a result of the crash.

The deploying passenger side air bag contacted the leading edge of the plastic shell of the infant restraint and fractured the shell predominantly at the left upper aspect of the restraint. The infant was restrained in the child safety device by the integral 3-point harness system. His head was presumably positioned at the upper area of the restraint and as a result of air bag contact, the infant sustained multiple skull fractures with brain tissue extruding from the fracture sites, multiple areas of hemorrhage, and massive brain swelling.

The infant was transported from the scene by ambulance to a local hospital where surgery was performed to elevate a depressed fracture site and to monitor intracranial pressure. He was subsequently transferred by air ambulance to a major trauma center where he expired approximately 28 hours post-crash.

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CALSPAN ON-SITE AIR BAG DEPLOYMENT INVESTIGATION
CALSPAN CASE NO. 95-22
VEHICLE: 1995 SATURN SL1
LOCATION: LOUISIANA
CRASH DATE: [redacted] 1995

SUMMARY

This on-site investigation focused of an air bag deployment crash that resulted in critical severity injuries and the subsequent death of 4 month old male infant occupant. The infant was properly restrained in a Evenflo Joyride infant restraint that was in a rearward facing position in the right front of a 1995 Saturn SL1. In addition to the infant, the driver's 4 year old daughter and 2 year old son were restrained in child restraints in the left rear and right rear seated positions respectively. The Saturn was equipped with driver and passenger side air bags that deployed as result of the intersection-type crash. The passenger side air bag expanded against the infant restraint, fracturing the plastic shell and displacing the restraint in a rearward direction. As a result of air bag contact against the child restraint, the infant sustained multiple skull fractures and injuries to the brain. He was transported to a local hospital where emergency surgery was performed to elevate a depressed skull fracture and monitor brain swelling. He was transferred to a major trauma center where he expired approximately 28 hours following the crash.

The crash occurred at a urban 4-leg intersection in Louisiana in [redacted], 1995, during daylight hours. Traffic flow through the intersection was controlled by stop signs and a flashing red beacon for the north and southbound travel directions. East/westbound traffic flow was uncontrolled, however, a flashing yellow beacon cautioned driver's traveling through the intersection. The dry road surfaces consisted of concrete and asphalt and were in worn condition. Dense vegetation adjacent to the northeast quadrant of the intersection obstructed the driver's views of approaching traffic. The posted speed limit was 40 km/h (25 mph).

The 1995 Saturn SL1 was driven by a 34 year old female with a stated height of 160.0 cm (63.0") and weight of 63.5 kg (140 lbs.). The Saturn was a lease vehicle that was provided by her husband's employer. They received the vehicle in [redacted] 1995, following a transfer to the Louisiana area. The driver stated that her familiarity with the vehicle was limited to two weeks of usage in [redacted] and several days prior to the crash in [redacted]. The driver stated that she did not review the Owner's Manual for the Saturn and was not familiar with the supplemental air bag system. She primarily drove and transported her children in a Jeep Cherokee. The Saturn was manufactured in [redacted] 1995, and was identified by vehicle identification number 1G8ZG5288SZ (production number deleted).

The driver was transporting her 4 year old daughter to a pre-school program and was traveling in a southerly direction on an approach to the four leg intersection. She traveled this route on a daily basis and was familiar with the intersection. On the approach to the intersection, the driver was momentarily distracted by her children in the rear seat of the Saturn. As she redirected her attention

forward, she noted that she was approaching the mouth of the intersection. The driver stated that she attempted to brake, however, he right foot slipped off the brake pedal of the Saturn. She reapplied the brakes with sufficient force to lock the front wheels of the vehicle as it skidded into the intersection.

A 1981 Ford F-100 pickup truck was traveling in a westerly direction on the intersecting roadway. The driver's view of the approaching Saturn was obstructed by the dense vegetation at the northeast corner of the intersection. As the Saturn emerged from the visual obstruction and entered the intersection, the driver of the Ford pickup truck braked and steered in a counterclockwise direction in an attempt to avoid impact. The investigating police officer noted on his report that the pickup truck skidded a distance of 7.6 m (24.9') to impact.

The front right bumper corner of the Ford pickup truck struck the left front (side) corner area of the Saturn in an endswipe-type configuration. Resultant directions of force were within the 12 o'clock sector for the striking pickup truck and 9 o'clock for the Saturn with respective Collision Deformation Classifications (CDC) of 12-FREE-6 and 09-LFEE-4. The Saturn sustained 15.5 cm (6.1") of rearward displacement of the left front bumper corner and 31.8 cm (12.5") of right lateral displacement at the radiator support panel. The Ford pickup truck sustained 10.2 cm (4.0") bumper crush with 135.3 cm (53.25") of contact damage extending onto the right front fender and door. Although the endswipe-type collision was outside the scope of computerized reconstruction programs, the Saturn underwent a sufficient velocity change which deployed the driver and passenger side air bag system. The impact rotated the Saturn approximately 175 degrees in a clockwise direction as it came to rest near the point of impact. The Ford pickup truck was redirected slightly in a counterclockwise direction by the impact force and driver induced steering inputs. The pickup truck came to a controlled stop 22.6 m (74.0') west of the point of impact.

The driver of the Saturn was in a forward driving position at impact with both hands on the steering wheel rim at the 10 and 2 o'clock sectors. She was properly restrained by the manual 3-point lap and shoulder belt system. The driver contacted the knee bolster and loaded the belt webbing and deployed air bag which prevented her from contact injury. She sustained minor thermal burns of the of the dorsal aspect of the forearms from the exhaust gases which vented from the driver's side bag.

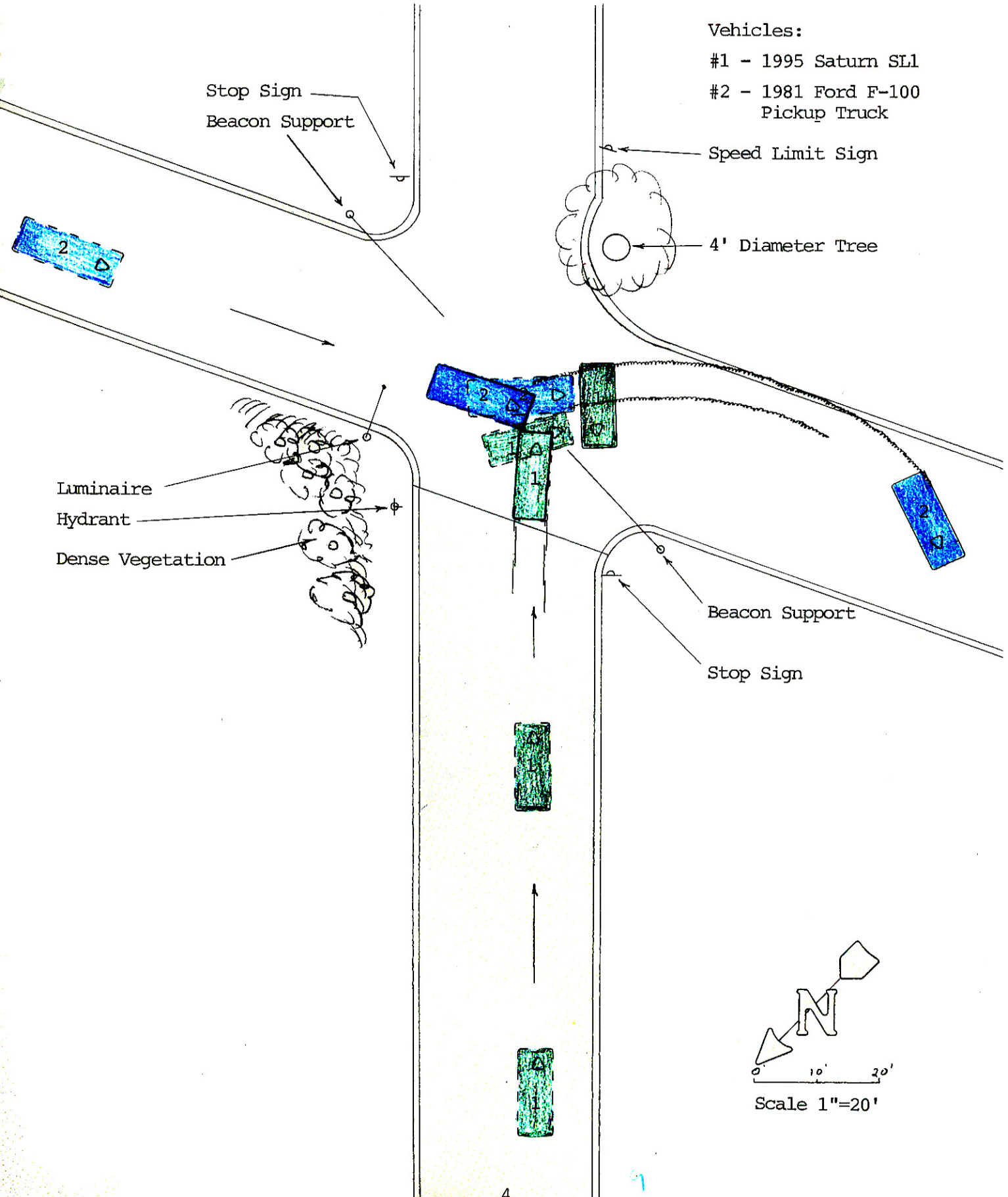
The infant was positioned in a rearward facing Evenflo Joyride restraint that was secured in the right front vehicle position by the lap belt webbing of the manual 3-point belt system. The deploying mid mount passenger side air bag expanded against the leading edge of the infant restraint. The bag fractured the plastic shell of the restraint and displaced the restraint rearward. The infant was secured in the restraint by the integral 3-point harness. The bag expansion against the restraint produced multiple head injuries which included massive brain swelling (AIS-5), uncal and tonsillar herniation (AIS-5), subdural and epidural hemorrhage (AIS-5), fractures of the right middle fossa through the sphenoid wing and floor (AIS-4), depressed skull fractures of the right parietal and temporal bones with brain matter extruding from the fracture sites (AIS-4), burst fracture of the left parietal bone (AIS-3), left subdural hemorrhage (AIS-4), brain lacerations (AIS-4), and contusions throughout the left and right occipital lobes (AIS-3). In addition, the infant sustained bilateral hemothorax (AIS-3) that probably resulted from bag expansion against the restraint.

The 4 year old child occupant in the left rear seated position was in a booster seat and was restrained by the vehicle's manual 3-point lap and shoulder belt system. She responded to the lateral impact force and loaded the manual belt webbing. As a result of restraint usage, the child was held in position and was not injured.

The 2 year old male occupant was seated in a Fisher Price convertible child restraint in the right rear position of the vehicle. He was properly restrained by the integral 3-point harness and the restraint was secured by the vehicle's 3-point lap and shoulder belt system. He remained in the restraint during the crash sequence and was not reported as injured.

Immediately following the crash, the driver of the Saturn noted that her infant son appeared apneic. She immediately unfastened her belt system and removed the infant restraint from the belt webbing and exited the vehicle with the infant in the restraint. She began to administer CPR techniques and was assisted by a passer-by as the driver asked for emergency notification. Rescue personnel arrived on-scene and transported the infant to a local hospital. He received emergency surgery for elevation of the depressed skull fractures and the placement of an internal monitor. He was subsequently transferred by air ambulance to a major trauma center where he expired approximately 28 hours following the crash.

CRASH SCHEMATIC
LOCATION: LOUISIANA



CALSPAN ON-SITE AIR BAG DEPLOYMENT INVESTIGATION
CALSPAN CASE NO. 95-22
VEHICLE: 1995 SATURN SL1
LOCATION: LOUISIANA

CRASH DATA

Location:	4-leg intersection
State:	Louisiana
Area/Type:	Urban/Residential
Crash Date/Time:	[redacted], 1995, daylight hours
Investigating Police Agency:	[redacted] Police Department
Crash Type:	Car/Pickup truck, front-to-side impact configuration
Air Bag Vehicle Occupant Injury Severity:	Driver - Minor (AIS-1) Right Front - Critical (AIS-5) Left Rear - Not injured Right Rear - Not injured

AMBIENCE

Viewing Conditions:	Daylight
Weather:	Overcast
Precipitation:	None
Road Surface:	Dry

HIGHWAY

	Air Bag Vehicle	Vehicle #2
Type:	Local street	Urban collector
Number of Lanes:	2	2
Width:	9.1 m (30.0')	9.1 M (30.0')

HIGHWAY (CONT'D.)

	Air Bag Vehicle	Vehicle #2
Surface:	Asphalt/Concrete	Concrete
Median:	None	None
Edge:	Concrete rain gutter with asphalt mountable curbs	Concrete rain gutters with asphalt mountable curbs
Vertical Alignment:	Level	Level
Horizontal Alignment:	Straight	Straight
Estimated Coefficient of Friction:	.628 (police measured)	.462 (police measured)
Traffic Density:	Sparse	Sparse

TRAFFIC CONTROLS

Signals:	Flashing red beacon	Flashing yellow beacon
Signs:	Stop sign	None pertinent
Markings:	None	None
Posted Speed Limit:	40 km/h (25 mph)	40 km/h (25 mph)

VEHICLES

	Air Bag Vehicle	Vehicle #2
Description:	1995 Saturn SL1, 4 door sedan	1981 Ford F-100, stepside pickup truck
V.I.N.	1G8ZG5288SZ (production number deleted)	2FTCF10E8BC (production number deleted)
Date of Manufacture:	[redacted]95	[redacted]81
Color:	Blue	Blue
Odometer:	16,473 km (10,236 miles)	150,265 km (93,373 miles)
Engine:	4 cylinder, 1.9 liter	6 cylinder, 4.9 liter

VEHICLES (CONT'D.)

	Air Bag Vehicle	Vehicle #2
Transmission:	5-speed manual, console mounted transmission selector lever	3-speed automatic, floor mounted transmission selector lever
Steering:	Power-assisted rack-and-pinion	Power-assisted recirculating ball
Brakes:	Power-assisted front disc, rear drum (not ABS equipped)	Power front disc, rear drum
Padding:	Upper and mid instrument panel, knee bolster, glove box door, driver and passenger side air bag module cover flaps, sunvisors, soft-edged steering wheel rim, door panels, door armrests, adjustable head restraints	Upper and mid instrument panel, aftermarket soft-edged steering wheel, door armrests, aftermarket fold-down center armrests, aftermarket integral head restraints
Manual Restraints:	3-point lap and shoulder belt system, inertia activated locking retractors with independent belt webbings affixed to a common latchplate and fixed D-rings in the front bucket seated positions, 3-point lap and shoulder belt systems in the rear outboard seated positions, center rear lap belt	3-point lap and shoulder belt systems in the front outboard seated positions, center front lap belt
Automatic Restraints:	Driver and passenger side Supplemental Inflatable Restraint System (SIR) which deployed as a result of the crash	Not equipped
Tow Status:	Towed due to vehicle damage	Towed due to vehicle damage

VEHICLE DAMAGE

	Air Bag Vehicle	Vehicle #2
Exterior:	The 1995 Saturn sustained moderately severe damage to the left front corner area of the vehicle as a result of its impact sequence with the front right corner area of the Ford pickup truck. The impact tore the endura-type bumper facia and separated the left two-thirds of the facia from the vehicle. Maximum structural crush to the Saturn was 15.5 cm (6.1") of rearward displacement of the aluminum bumper reinforcement bar with 31.8 cm (12.5") of lateral displacement located at the front left corner. The direct contact damage began on the left corner of the bumper facia and extended both rearward onto the side surface of the vehicle and laterally across the front. The frontal contact damage extended 105.4 cm (41.5") across the facia ending at a point 44.5 cm (17.5") right of center. Left side contact damage extended 38.1 cm (15.0") rearward of the leading edge of the fender. This resulted from the sustained contact between the vehicles and they rotated following the initial engagement.	The Ford F- pickup truck sustained moderate damage that resulted from its impact sequence with the 1995 Saturn. The impact initially occurred at the right front corner area of the vehicle and extended onto the right side as the vehicles engaged throughout the crash sequence. The direct contact damage began on the front bumper face 59.4 cm (23.4") right of center and extended 34.9 cm (13.4") to the right corner. The bumper was crushed to a maximum depth of 10.2 cm (4.0") located at the extreme right corner. Bumper deformation extended 43 cm (17.0")from the right frame rail to the right corner. The damage subsequently extended rearward in a sideswipe-type pattern onto the right front fender, tire and wheel, and onto the leading edge of the right door. The steel aftermarket wheel was deformed at the perimeter and the right wheelbase was reduced by 19.6 cm (7.75").

VEHICLE DAMAGE (CONT'D.)

Air Bag Vehicle

The impact separated the bumper facia and the styrofoam-like filler that was located between the facia and the bumper reinforcement bar. The crush profile was documented at the bumper reinforcement bar level and was as follows: C_1=15.5 cm (6.1"), C_2=7.6 cm (3.0"), C_3 =4.4 cm (1.75"), C_4=1.9 cm (0.75"), C_5=1.3 cm (0.5"), C_6 =0.0 cm. These values represent the actual residual crush profile with the free-space and filler panel width deducted from the field measurements.

The lateral impact force displaced the frontal structure laterally to the right and rearward. Lateral displacement at the left corner of the radiator support panel was 31.8 cm (12.5") with 19.7 cm (7.75") of lateral displacement at the right corner. The left bumper mount frame rail was displaced 21.6 cm (8.5") to the right. The bumper subsequently separated from the right side rail. Damaged components included the front bumper facia, bumper filler panel and reinforcement bar, header panel, both headlamp

Vehicle #2

The right side contact damage began 214.0 cm (84.25") forward of the right rear axle position and extended 135.3 cm (53.25") forward to the deformed bumper corner.

The right fender at the trailing edge of the right front wheel opening was crushed to a depth of 14.0 cm (5.5") which resulted from engagement with the bumper reinforcement bar of the Saturn.

VEHICLE DAMAGE (CONT'D.)

	Air Bag Vehicle	Vehicle #2
Exterior (Cont'd.):	assemblies, hood, front fenders, radiator, air conditioning condenser, and the radiator support panel.	
CDC:	09-LFEE-4	12-FREE-6
Repair Cost:	Total loss	$1500.00 (owner estimate)

Interior (Air Bag Vehicle):

Interior damage was minimal and was limited to deployment of the Supplemental Inflatable Restraint System, the subsequent contact of the passenger side air bag with the rearward facing child restraint, and driver contact with the knee bolster. The air bag system data is included in this report under the section entitled Automatic Restraint System. There was no interior damage associated with exterior deformation or intrusion of interior components.

The driver's knees contacted the knee bolster during the crash. Although the lateral impact force would have displaced the driver to her left, her forward seat track position allowed her knees to contact the bolster on each side of the steering assembly. The left knee scuffed and abraded the bolster 43.2-50.1 cm (17.0-20.0") left of center and 33.0-36.8 cm (13.0-14.5") above the floor of the vehicle. The right knee contact produced a horizontally oriented abrasion to the bolster 25.4-30.4 cm (10.0-12.0") left of center and 33.0-35.6 cm (13.0-14.0") above the floor pan (refer to Photograph No. 31).

AUTOMATIC RESTRAINT SYSTEM

The 1995 Saturn was equipped with a Supplemental Inflatable Restraint System (SIR) that consisted of dual driver and passenger side air bags which deployed as a result of the crash with the pickup truck. The driver side air bag was incorporated into the steering wheel hub assembly in a typical configuration while the passenger side air bag was mounted into the mid right instrument panel.

The driver side air bag deployed as designed from a notched I-configuration air bag module cover assembly (refer to NASS Interior Vehicle Form, Page No. B-29) that was contained within the four-spoke steering wheel. The I-configuration flaps were hinged at the sides with a vertical center tear seam and horizontal perimeter seams. The left module cover flap had overall dimensions of 10.2 cm (4.0") horizontally and 13.3 cm (5.25") vertically with a 3.8 x 1.3 cm (1.5" x 0.5") notch. The right side cover flap was symmetrical to the left with

AUTOMATIC RESTRAINT SYSTEM (CONT'D.)

with a mating tab for the left side notch. The word AIRBAG was molded into the lower right corner of the right side cover flap. The air bag was constructed of a typical nylon-type fabric with a neoprene liner and was 61.0 cm (24.0") in diameter. The bag was vented with two 1.9 cm (0.75") diameter ports that were located on the back side of the air bag at the 11 and 01 o'clock sectors. The ports were positioned 12.7 cm (5.0") outboard of the gas generator and 8.6 cm (3.4") inboard of the internally sewn peripheral seam. The driver air bag was tethered with four internal tether straps that extended from a 17.8 cm (7.0") diameter origin sewn to the face of the bag. The driver's side air bag was mounted to a tilt steering wheel with an energy absorbing steering column. There was no compression to the shear capsule units or the energy absorbing column. Although the driver loaded the deployed air bag during the crash, there was no evidence of occupant contact, or damage to the bag.

The passenger side air bag assembly was mounted into the mid aspect of the right instrument panel with a vertically oriented cover flap. The module cover flap opened at the designated tear points along the bottom and side surfaces and was hinged at the top which allowed the cover flap to open in an upward direction. The vinyl cover flap measured 30.5 cm (12.0") horizontally and 12.7 cm (5.0") vertically with radiuses at the corners. AIRBAG was molded into the lower right corner of the cover flap. Identification labeling was embossed on the inside surface of the cover flap and was recorded as follows:



In addition to this identification, the cover flap had a clock-type date stamp which identified the date of manufacture at [redacted]/95.

The face of the passenger side module cover flap had a faint scuff-type mark that was horizontally oriented across the lower left aspect of the flap. The scuff began 0.6 cm (0.25") right of center and extended 8.9 cm (3.5") to the left and was vertically located 0.6-1.3 cm (0.25-0.5") above the lower edge. A whitish-like fabric transfer which probably resulted from the deploying air bag was noted to the left upper quadrant of the cover flap. The transfer extended 10.2-13.3 cm (4.0-5.25") left of the flap's centerline and 5.1 cm-7.9 cm (2.0-3.1") below the top hinge point.

The passenger bag was constructed of a woven nylon-type fabric which was porous in design with no external vent ports. The bag was tethered with two wide internal tethers that were sewn to the face of the bag with a blue colored stitching. The stitch patterns for the tethers were approximately 35.6 cm (14.0") in width. A wide band of blue stitching was utilized to sew the top and side panels which formed the passenger side air bag to the fabric which attached the bag to the inflator assembly. This wide band of stitching was located 27.9 cm (11.0") outboard of the inflator and was used as a reference point to locate contact evidence that was observed on the bag.

AUTOMATIC RESTRAINT SYSTEM (CONT'D.)

There were four distinct points of interest on the passenger side bag that were related to the deployment and subsequent contact with the rearward facing infant restraint (refer to Photograph Nos. 42-45). A black vinyl transfer was noted to the right side of the bag and was located 11.4-25.4 cm (4.5-10.0") below the referenced seam and 11.4-14.0 cm (4.5-5.5") right of the centerline of the bag. This transfer probably resulted from the expansion of the bag during deployment against the inside surface of the module cover flap. There was a vertically oriented gray/black vinyl transfer on the lower face of the passenger bag that was located 31.8-39.4 cm (12.5-15.5") below the seam and 7.6-14.0 cm (3.0-5.5") right of center. This transfer probably resulted from expansion against the cover flap and/or contact with the upper aspect of the child restraint. The third area consisted of an abrasion to the face of the bag that was located 25.4 cm (10.0") below the referenced seam and 11.4 cm (4.5") right of center. A similar abrasion was located 11.4 cm (4.5") right of center and 45.7 cm (18.0") below the horizontal seam. The abrasions probably resulted from passenger side air expansion against the child restraint.

The left upper quadrant of the right sunvisor contained a label which advised the following:

Air Bag
See Other Side

The label affixed to the other side of the visor (side against headliner) provided the following caution (refer to Photograph No. 51):

CAUTION: TO AVOID SERIOUS INJURY

- For maximum safety protection in all types of crashes, you must always wear your safety belt.
- Do not install rearward-facing child seats in any front passenger seat position.
- Do not sit or lean unnecessarily close to the air bag.
- Do not place any objects over the air bag or between the air bag and yourself.

See Owner's Manual for further information and explanations.
Part No. [redacted]

MANUAL RESTRAINTS

The Saturn was equipped with manual 3-point lap and shoulder belts in the two front seated positions. The belt systems consisted of separate lap and shoulder belt webbing that were attached to a common latchplate. Inertia activated locking retractors were mounted in the base of the B-pillars for the shoulder belt webbing and in the sills of the vehicle for the lap belt. The B-pillar mounted D-rings were fixed pivot points for the shoulder belts webbings. The front belts attached to a buckle assembly that was located at the inboard aspect of the front seat cushions.

The right front belt latchplate was identified by part number [redacted]. A caution label was printed on the outboard aspect of the lap belt webbing and was located 26.0-38.7 cm (10.25-15.25") below the latchplate. The advisory was as follows:

MANUAL RESTRAINTS (CONT'D.)

CAUTION
A child in a rear-facing child restraint can be badly injured by the SIR ("air-bag") if it inflates. NEVER put a child in a rear-facing child restraint in the front seat of this vehicle. Secure a rear-facing child restraint in the rear seat.

Before securing a forward-facing child restraint, ALWAYS move the front passenger seat as far back as it will go. Then pull the safety belt out all the way to lock the belt, so you can use it with the forward-facing child restraint. Or, secure the child restraint in the rear seat.

For more information, see your Owner's Manual and the instructions that came with your child restraint.



This caution label was printed on the inside surface of the belt webbing and was not visible as the belt was extended from the retractor and positioned over the child restraint as documented in Photograph No. 49.

A blue fabric transfer was noted to the right shoulder belt webbing, located at the mid width of the webbing and 9.5-21.8 cm (3.75-8.6") above the latchplate. The transfer was slightly circular in shape and probably resulted from interaction with the padded child restraint liner during the crash and the displacement of the restraint from the subsequent deployment of the passenger side air bag.

The rear seat of the Saturn was equipped with 3-point lap and shoulder belts in the outboard seated positions and a center lap belt. All belt systems in the vehicle yielded evidence of frequent usage by wear marks on the latchplates, however, there was no loading type evidence on the left front and rear seat belt components.

CHILD RESTRAINTS

The driver of the vehicle was the mother of three young children ranging in ages from 4 months to 4 years of age. She stated that she diligently placed the children in appropriate child restraints and secured the restraints with the vehicle's manual belt systems during all vehicular travel. The Saturn's rear seat was designed as a three passenger seat with three individual restraint systems, however, the rear seat was not wide enough for the three child restraints. Therefore, the driver had to place one of the children in the right front position. She decided that the infant required the greatest amount of attention within the vehicle and placed the infant in the right front position behind the passenger side air bag.

CHILD RESTRAINTS (CONT'D.)

The 4 month old infant was placed in a Evenflo Joyride infant restraint that was designed for children from birth weight through 9.1 kgs (20 lbs.). In addition, the Evenflo Joyride was designed as a rear facing child restraint. The Evenflo Joyride infant restraint was initially purchased by the driver and her husband in Canada for their first child (currently 4 years of age) and was used throughout the infancy of their second child. The restraint remained in good condition and was used for their third child. The manufacturers data was embossed into the plastic shell of the restraint and was as follows (refer to Photograph No. 65):

Evenflo Juvenile

[redacted]CA[redacted]

A paper label was affixed to the restraint directly below the embossed manufacturers data listed above. This label illustrated the proper routing of the vehicle's belt system for both lap belt only installations and 3-point lap and shoulder belt systems. The upper third portion of this label had been worn away, however, the remaining segment contained the model numbers and date of manufacture. (The paper labels on this restraint expressed all advisories in both English and French.) The Model No. was identified as [redacted] and the Date of Manufacture was printed as [redacted] 1991. This label had a revision date of [redacted]90 and was identified as Part No. [redacted] (refer to Photograph No.66).

A storage compartment was manufactured into the upper aspect of the plastic shell of the infant restraint. The door for this compartment was hinged at the bottom and was equipped with a top center plastic tab which served as a latch to access the compartment. The following data was embossed into the door panel (refer to Photograph No. 67):

IMPORTANT: INSTRUCTIONS IN POUCH - ALWAYS REPLACE FOR FUTURE REFERENCE

IF INSTRUCTIONS ARE LOST
OR MISSING CALL EVENFLO
FOR REPLACEMENT
[redacted](IN U.S.)
[redacted](IN CANADA)

-CAUTION-
NEVER LEAVE CHILD UNATTENDED
-IMPORTANT-
INSTRUCTIONS IN POUCH - ALWAYS
REPLACE FOR FUTURE REFERENCE

DO NOT USE TRAY OR CANOPY WHEN USING CARRIER IN AN AUTOMOBILE

(The instructional pamphlet was not stored in the compartment of the infant restraint.)

CHILD RESTRAINTS (CONT'D.)

The infant restraint was equipped with an adjustable carrying handle that was mounted to the mid aspect of the shell. The restraint was positioned in the vehicle with the handle extended upward, nearly perpendicular to the shell.

The infant was restrained in the Evenflo Joyride infant restraint by the 3-point harness system. The driver stated that the harness was properly positioned over the shoulders of the infant with the latchplate securely fastened into the center mounted buckle assembly. Although the infant restraint had been removed from the vehicle and the harness removed from the restraint, the driver stated that the shoulder belts were positioned through the lowest set of the three available slots in the backrest portion of the plastic shell (refer to Photograph No. 70).

There was a single pair of vehicle seat belt guide loops molded into the plastic shell of the infant restraint. The loops were located between the center mounted carrying handle and the base of the restraint. The loops were designed for the vehicle's lap belt webbing when used with either a lap belt only system, or a 3-point lap and shoulder belt system. The previously referenced label that was affixed to the bottom of the restraint identified the use of a locking clip when used with a 3-point belt system. The illustration (refer to Photograph No. 66) placed the locking clip at the latchplate of the belt system and positioned the shoulder belt across the leading edge of the rearward facing restraint. There was no locking clip used in the installation of the infant restraint in the Saturn and the shoulder belt webbing extended across the vehicle's seat back as documented in Photograph No. 66.

During the inspection of the Saturn, the driver placed the Evenflo Joyride infant restraint in the Saturn in the approximate position of the restraint on the day of the crash and extended the manual belt system through the belt loops. The vehicle's seat track was found adjusted to the full rear position and the seat back support was set to the second reclined position. These adjustments of the right front seat were the positions of the mechanisms at the time of the crash. The infant restraint was positioned on its base in a rearward facing position, reclined resting on the flats of the restraint base. In this position, the leading edge of the restraint was approximately 5.4 cm (2.125") rearward of the mid right instrument panel and passenger side air bag assembly, and 3.2 cm (1.25") below the lower edge of the module cover flap. With the restraint in this position, it was rearward and below the path of the top hinged passenger side air bag module cover flap, therefore the restraint would not have been contacted by the cover flap. There was no contact evidence on the restraint (i.e., black vinyl transfers) to support cover flap contact.

At impact, the driver and passenger side air bags deployed. The passenger side air bag expanded against the leading edge of the infant restraint, fracturing the plastic shell of the restraint and displacing the restraint rearward as the bag inflated to its full volume. As a result of air bag contact and expansion, the left upper quadrant (outboard aspect with respect to the vehicle) of the infant restraint was severely fractured. An irregular vertically oriented fracture

CHILD RESTRAINTS (CONT'D.)

line originated 3.5 cm (1.375") below the upper edge of the storage compartment door and extended 14.0 cm (5.5") to the top of the shell, ending at a point 7.6 cm (3.0") left of center. A horizontal fracture line intersected the vertical line at a point that was 6.4 cm (2.5") below the top of the shell. The horizontal line extended over the outboard reinforcement of the restraint approximately 6.4 cm (2.5") and wrapped 7.0 cm (2.75") onto the side surface of the shell. The fracture line continued downward an additional 5.1 cm (2.0") onto the left side of the restraint (refer to Photograph No. 70). A second horizontal fracture line occurred at the left upper corner of the storage compartment. This fracture point was located 5.3-9.1 cm (2.1-3.6") left of center (refer to Photograph No. 71). On the right side of the restraint (when viewed from back), a partial fracture occurred adjacent to and inboard of the right vertical reinforcement. The vertically oriented fracture was located 9.5 cm (3.75") right of center and was 4.4 cm (1.75") in length (refer to Photograph No. 72). In addition to the right fracture line, the plastic shell was stressed directly above the vertical reinforcement. Air bag fabric transfers (faint in appearance) were noted above and to the right of the storage compartment door. There was no additional damage to the infant restraint.

The left rear seated child occupant (4 year old female) was positioned on a platform-type booster seat and was restrained by the vehicle's manual 3-point lap and shoulder belt system. The specific manufacturer and model of the booster seat was unknown. There was no visible contact evidence within the vehicle from this occupant, therefore this combination was effective in restraining the child occupant.

The right rear child occupant was restrained in a Fisher Price convertible-type child restraint. The driver stated that he was properly restrained by the integral 3-point harness and that the child restraint was properly restrained with the vehicle's 3-point belt system. There was no damage to the restraint or contact points within the vehicle from this occupant. There were imprints in the rear seat cushion from both the booster seat and the convertible restraint.

COLLISION SEQUENCE

Pre-Crash:

The driver of the Saturn stated that she was familiar with the area of the crash since she travelled the same route on a daily basis while transporting her daughter to the pre-school facility that was located several blocks from the intersection. She noted that her familiarity with the 1995 Saturn was limited. Her husband received the Saturn as a company supplied lease vehicle on [redacted] 1995, following the family's transfer to the Louisiana area. The driver stated that the vehicle was delivered to them and that there was no instructional information provided regarding the operation of the vehicle, or the vehicle's safety systems. She did not read the owner's manual and was not familiar with the advisory labels that were affixed to the sunvisors and belt webbings. As citizens of Canada, the driver and her

COLLISION SEQUENCE (CONT'D.)

Pre-Crash (Cont'd.):

husband were dedicated seat belt users, however, the driver had limited knowledge of air bag systems and assumed the Saturn was equipped with air bags.

The Saturn was used exclusively during their first two weeks in the area while awaiting the shipment of their personal vehicle, a Jeep Cherokee. The driver had positioned the child restraints for her two older children in the outboard positions of the rear seat of the Saturn and placed her infant son in the right front position. She noted that the rear seat was not wide enough to accommodate two child restraints and a booster seat, therefore one of the children had to ride in the right front position.

Following the arrival of the Jeep Cherokee at the end of [redacted] the driver relied on the Jeep exclusively to transport her children. The Cherokee was not equipped with air bags, therefore the Saturn was the first vehicle operated by the driver that was equipped with air bags. Several days prior to the crash, the driver misplaced her keys to the Cherokee and relied on the Saturn for transportation.

On the day of the crash, the driver was transporting her 4 year old daughter (left rear occupant) to pre-school and was traveling in a southerly direction on the two-lane street. She stated that she was traveling at approximately 40 km/h (25 mph) and was decelerating as she approached a four-leg intersection. North/southbound traffic flow through the intersection was controlled by stop signs and an overhead flashing red beacon. East/westbound traffic flow was uncontrolled, however, a flashing yellow beacon cautioned drivers traveling through the intersection. The Ford F-100 pickup truck was traveling in a westerly direction on the intersecting street at a driver estimated speed of 40 km/h (25 mph). Dense vegetation, which consisted of mature trees, shrubs, and plants, parallelled the curblines at the northeast corner of the intersection and obstructed the views of the approaching vehicles for both drivers. As documented in Photograph Nos. 4, 10, and 11, the vegetation obstructed the pre-crash travel paths of the vehicles at a distance of approximately 15 m (50') from the mouth of the intersection. A vehicle traveling at the posted speed limit of 40 km/h (25 mph) would be traversing 11 m/sec (37 ft/sec). Assuming an average perception/decision/ reaction (PDR) time of 1.2 seconds, a vehicle would travel approximately 13.4 m (44.4') prior to initiation of avoidance action.

On the approach to the intersection, the driver of the Saturn stated to the investigating police officer that she was momentarily distracted by her children in the rear seat. She turn to direct her attention toward them as she continued to travel in a southerly direction. As she redirected her attention toward the roadway, the driver noted that she was near the mouth of the intersection. She attempted to brake, however, the driver stated that her right foot had slipped off the brake pedal. She subsequently reapplied the brakes with sufficient force to lock the front wheels of the vehicle. The Saturn skidded in a tracking mode into the

COLLISION SEQUENCE (CONT'D.)

Pre-Crash (Cont'd.)

westbound travel lane of the intersection. The investigating officer documented 4.5 m (14.9') of pre-impact skid marks from the Saturn. During Calspan's on-site investigation which occurred three weeks following the crash, 6.8 m (22.4') of right front skid mark and 4.3 m (14.2") of left front skid mark were visible on the asphalt and concrete road surfaces. This braking distance equated to an equivalent velocity loss of 28.3 km (17.6 mph).

The driver of the Ford F-100 pickup truck observed the Saturn as it emerged from the visual obstruction and entered the intersection. He immediately applied a braking force and steered in a counterclockwise (CCW) direction in an attempt to avoid impact. The investigating officer noted on his report that the F-100 pickup truck skidded 7.6 m (24.9') to impact. At the time of our on-site investigation, there was no remaining evidence of pre-impact skidding from the Ford pickup truck. The police reported skidding equated to an equivalent velocity loss of 34.9 km/h (21.7 mph).

Crash:

The front right corner area of the Ford F-100 pickup truck impacted the left front corner area of the Saturn in an endswipe-type configuration. Resultant directions of force were within the 12 o'clock sector for the striking pickup truck and 9 o'clock for the Saturn. Following the initial contact, the front bumper of the Ford pickup truck deformed to a maximum (residual) depth of 10.2 cm (4.0") and as the vehicle continued forward, the right side area of the truck swiped across the front of the Saturn. As this engagement occurred, the Saturn was rotated in a CW direction which allowed the left front fender of the vehicle to contact the right side of the Ford in a continuous sequence prior to separation. Due to the endswipe configuration, the vehicles did not achieve a common velocity, therefore the crash was outside the scope of a computerized reconstruction of the velocity changes. Based on the exterior damage pattern, the Saturn underwent an estimated velocity change of 12-19 km/h (8-12 mph). The impact induced deceleration was sufficient to deploy the vehicle's supplemental driver and passenger side air bag system.

The Saturn was rotated rapidly in a CW direction by the lateral impact force. The vehicle rotated approximately 175 degrees within its length before coming to rest facing opposite of its initial direction of travel. The Ford pickup truck was deflected in a counterclockwise (CCW) direction as a result of the corner impact as it continued in a westerly direction. The vehicle traversed the eastbound travel lanes and contacted the south (left side) mountable curb as the driver steered in a CW direction. His steering input redirected the Ford pickup truck in a CW direction as he brought it to a controlled stop approximately 22.6 m (74.0') west of the point of impact.

COLLISION SEQUENCE (CONT'D.)

Post-Crash:

Final Rest -

The 1995 Saturn came to rest straddling the center of the east/westbound travel lanes. At rest, the vehicle had rotated approximately 175 degrees in a CW direction and came to rest within a car length from its impact position. The Ford pickup truck came to rest diagonal to the east/westbound travel lanes approximately 22.6 m (74.0') west of the point of impact. At rest, the pickup truck was facing in a northwesterly direction, approximately 47 degrees CW of its impact heading angle. Both vehicles sustained disabling damage and were towed from the scene.

Driver Activities -

Immediately following the crash, the driver of the Saturn detected a gunpowder-like odor within the vehicle and observed the deployed air bags. In addition, she noted a black powder-like substance on her hands and arms which she attributed to the deployment of the air bags. She subsequently focused her attention on her children and observed that the infant positioned in the rearward facing child restraint in the right front position appeared to be apneic. The driver immediately unfastened her manual 3-point lap and shoulder belt system and disengaged the child restraint from the belt webbing. She opened the left front door and grabbed the upright carrying handle on the restraint and removed the infant and restraint from the vehicle. She placed the restraint on the ground and removed the infant and administered CPR techniques. The driver yelled out for someone to call 911 and request an ambulance. A passer-by stopped at the crash scene and assisted the driver in caring for the infant. She stated that there was no visible injury to the child immediately following the crash, however, a contusion began to form over the basilar scalp area within ten minutes of the crash. The driver returned to the vehicle and removed her children from the rear seat of the vehicle.

Police Activities -

A police officer on routine patrol was flagged down approximately a block from the crash scene by person who observed the crash. This officer responded to the scene and observed the infant lying adjacent to the vehicle. The officer checked the condition of the infant and radioed to police headquarters for an ambulance. Another officer was subsequently dispatched to the scene and arrived within several minutes of the call. He requested further assistance from headquarters due to the severity of the injuries to the infant. A third officer was dispatched to the scene and arrived approximately 14 minutes following the crash and took charge of the investigation. Prior to the arrival of the ambulance, the officer's had decided to transport the infant to the hospital in the police vehicle, however, as the infant was carried from the street, the ambulance arrived on-scene. Several additional officer's responded to the crash scene to assist with various functions of the investigation. These included documenting the crash scene, interviewing the driver of the Ford pickup truck, and performing test skids to determine friction coefficients of the intersecting streets following the removal of the vehicles.

COLLISION SEQUENCE (CONT'D.)

Post- Crash (Cont'd.):

Rescue Activities -

A local ambulance service responded to the crash scene and arrived approximately seven minutes following the crash. The ambulance attendants placed the infant on the stretcher and administered emergency treatment. They departed the scene in approximately three minutes en route to a local hospital with the driver (mother) escorting the infant to the hospital. The remaining two child occupants were left at the scene with an acquaintance of the family.

Scene Clearance -

The involved vehicles sustained disabling damage and were towed from the scene and impounded by police as the follow-up investigation continued.

HUMAN FACTORS/OCCUPANT DATA

Air Bag Vehicle

Driver:	34 year old female
Height:	160.0 cm (63.0")
Weight:	63.5 kg (140.0 lbs.)
Manual Restraint Usage:	3-point lap and shoulder belt system
Usage Source:	Vehicle inspection, driver interview
Eyeware:	Prescription eyeglasses (myopia), displaced from face, not damaged
Vehicle Familiarity:	Approximately two (2) weeks
Route Familiarity:	Daily
Trip Plan:	Transporting daughter to pre-school
Mode of Transport From Scene:	Ambulance with injured infant
Type of Medical Treatment:	None

DRIVER INJURIES

Injury	Severity (AIS-90)	Injury Mechanism
Minor thermal burns on the dorsal aspect of the forearms	Minor (792002.11, 792002.12)	Driver's side air bag exhaust gases

DRIVER KINEMATICS

The driver of the 1995 Saturn was in a normal posture at impact with both hands positioned on the steering wheel rim at the 10 and 2 o'clock sectors. She was wearing a Tee-shirt and shorts with a watch on her left wrist, and a necklace. Her seat track was adjusted to a forward position (one notch from full forward) with the seat back set to the most vertical adjustment point. The driver was properly restrained by the manual 3-point lap and shoulder belt system. There was no direct evidence of driver loading on the belt system, however, the latchplate contained heavy wear marks which indicated frequent belt usage. The adjustable head restraint was positioned in the down mode on top of the seat back.

At impact with the Ford pickup truck, the supplemental driver and passenger side air bag system deployed. The driver responded to the 10 o'clock impact force by moving laterally to her left and forward. Due to her pre-crash position which placed her within a close proximity to the air bag, her trajectory was limited. She loaded the manual belt webbing and the deployed air bag which prevented her from contact with interior components and injury. Her involvement with the deployed air bag resulted in displacement of her prescription eyeglasses, however, the driver was not injured and the glasses were not damaged.

The driver stated that she observed a blackish powder-like substance on her arms and hands which was attributed to the air bag exhaust gases which vented from the ports located at the 11 and 1 o'clock sectors of the driver bag. She sustained minor severity thermal burns from the generant residue to the dorsal aspect of the forearms, bilaterally.

The driver came to rest in an upright posture behind the steering assembly. She observed her infant son in the rearward facing child restraint in the right front position of the vehicle and noted that he was apneic. The driver immediately unbuckled her manual belt system and disengaged the belt webbing from the Evenflo child restraint and exited the vehicle, grasping the carrying handle of the child restraint. She subsequently escorted the infant in the ambulance to a local hospital where he was admitted for treatment.

RIGHT FRONT PASSENGER

Age/Sex:	4 month old male
Length:	61.6 cm (24.25")
Weight:	7.7 kg (17.0 lb.)
Head Circumference:	45.7 cm (18.0")
Chest Circumference:	41.3 cm (16.25")
Manual Restraint Usage:	Child was positioned in a reclined attitude in a Evenflo Joyride rearward facing infant restraint and was restrained by the integral 3-point harness. The infant restraint was secured to the right front position by the vehicle's 3-point lap and shoulder belt system.
Usage Source:	Vehicle inspection, driver interview, police report
Automatic Restraints:	Deployment of the passenger side mid mount air bag
Mode of Transport From Scene:	Ambulance
Type of Medical Treatment:	Transported to a local hospital with subsequent air transfer to a regional trauma center where he expired approximately 28 post-injury

RIGHT FRONT PASSENGER INJURIES

Injury	Injury Severity (AIS-90)	Injury Mechanism
Autopsy		
Massive brain swelling, weight of 805 grams	Critical (140666.50)	Deploying passenger side air bag
Uncal and tonsillar herniation, bilaterally	Critical (140202.58)	Deploying passenger side air bag
Right subdural hemorrhage 12.0 x 5.0 x 0.6 cm	Critical (140656.51)	Deploying passenger side air bag
Bilateral epidural hemorrhage	Critical (140634.53)	Deploying passenger side air bag

PASSENGER INJURIES (CONT'D.)

Injury	Injury Severity (AIS-90)	Injury Mechanism
Branching fractures extend into the lateral wall of the right middle fossa reaching the sphenoid wing and floor and cover 11.0 x 5.0 cm with the central area depressed, fracture on the left branches into the upper lateral middle fossa and reaches the frontal suture	Severe (150206.48)	Deploying passenger side air bag
Disruption of the bone and periosteum with brain tissue extruding through a branching depressed fracture centered 6.4 cm above the right ear canal through the inferior parietal and temporal bones, extending upward and rearward, downward and forward, covering 8.0 x 3.5 cm, dura disrupted by jagged bone fragments depressed into the right lateral cerebral hemisphere 2.6 x 1.8 cm, with brain tissue extruding from the right frontal and temporal lobes	Severe (150406.41)	Deploying passenger side air bag
Linear burst fracture of the left parietal bone extending from the sagittal fissure leftward, slightly downward and forward, 7.5 cm in length with 4.0 mm of separation and an anterior branch into the coronal suture 2.8 cm	Serious (150404.32)	Deploying passenger side air bag

PASSENGER INJURIES (CONT'D.)

Injury	Injury Severity (AIS-90)	Injury Mechanism
Left subdural hemorrhage, 10.0 x 2.0 x 0.3 cm	Severe (140652.42)	Deploying passenger side air bag
Brain laceration with fragmentation of lateral right temporal and frontal lobes, 5.0 x 3.0 cm area	Severe (140688.41)	Deploying passenger side air bag
Thin film of subarachnoid blood over the entire brain	Serious (140652.42, 140652.41)	Deploying passenger side air bag
Cerebellum swelling with hemorrhagic herniation of the tonsils	Serious (140450.38)	Deploying passenger side air bag
Bilateral hemothorax	Serious (442202.33)	Deploying passenger side air bag, infant restraint loading
Contusion hemorrhage in the dermis and subcutaneous tissues over the right scalp	Minor (190402.10)	Deploying passenger side air bag
Operating Room Report		
Multiple intracranial contusions throughout the left temporal and right occipital lobes	Serious (140620.33)	Deploying passenger side air bag,

RIGHT FRONT PASSENGER KINEMATICS

The right front infant occupant of the 1995 Saturn was positioned in a rearward facing Evenflo Joyride infant restraint. The infant's mother (driver) placed the restraint in a reclined position on the right front seat cushion and properly routed the vehicle's lap belt webbing through the integral belt loops of the restraint's plastic shell (refer to Photograph Nos. 33-36). The vehicle's right front seat track was adjusted to the full rearward position and the seat back was reclined to the second adjustment point. With the infant restraint in this position, the leading edge of the restraint was approximately 5.4 cm (2.125") rearward of the right mid instrument panel and the passenger side air bag module cover flap.

RIGHT FRONT PASSENGER KINEMATICS (CONT'D.)

The infant was lying on his back in the rearward facing position and was belted in the Evenflo Joyride restraint with the 3-point harness. The shoulder belts of the restraint's harness were positioned thought the lowest set of the three adjustment slots in the backrest of the restraint (refer to Photograph No. 70).

At impact, the supplemental driver and passenger side air bags deployed. The mid mount passenger side air bag module cover flap opened at the designated tear points in an outward and upward direction. The infant restraint was positioned rearward and below the trajectory of the module cover flap, therefore there was no cover flap contact with the infant restraint. The deploying air bag subsequently expanded against the leading edge of the rearward facing infant restraint. The air bag fractured the plastic shell of the restraint and rotated the restraint in a rearward direction into the right front seat back (refer to Photograph No. 38).

The infant's head was positioned at the upper area of the restraint in the vicinity of the fractured shell. As a result of the air bag expansion against the Evenflo Joyride restraint, the infant sustained a contusion hemorrhage in the dermis and subcutaneous tissues over the right scalp, a depressed, fragmented fracture through the inferior right parietal and temporal bones with brain tissue extruding through the fracture sites, a branching fracture into the lateral wall of the right middle fossa, sphenoid wing, and floor, a linear burst fracture of the left parietal bone, bilateral uncal and tonsillar herniation, right subdural hemorrhage, bilateral epidural hemorrhage, left subdural hemorrhage, brain laceration with fragmentation of the lateral right temporal and frontal lobes, multiple intracranial contusions throughout the left temporal and right occipital lobes, cerebral swelling with hemorrhagic herniation of the tonsils, subarachnoid bleed, and massive swelling of the brain with a autopsy weight of 805 grams. In addition to the head injuries, the infant sustained bilateral hemothorax which probably resulted from the expansion of the air bag against the infant restraint, and or subsequent loading of the integral 3-point harness as the restraint contacted the vehicle's seat back.

Immediately following the crash, the driver removed the infant and the restraint from the vehicle. She place the restraint on the road surface and removed the infant from the restraint and began to administer CPR techniques. She was assisted at the scene by a passer-by who stopped to offer aid. The infant was subsequently transported by ambulance to a local hospital where he was admitted for treatment of his injuries. Following consultation and diagnosis of the critical head injuries, the infant was scheduled for emergency craniotomy surgery for elevation of the depressed skull fragment and measurement of intracranial pressure. The operative report indicated that the initial intracranial pressure was 7 mm mercury and that the pressure was 6 mm as the infant was transferred to recovery.

The condition of the infant declined over the next several hours. The attending physician suggested transfer of the infant to a trauma center that could provide more acute care for the infant. He indicated that the infant had an approximate 2 percent chance for survival,

RIGHT FRONT PASSENGER KINEMATICS (CONT'D.)

however, suggested to the family that the transfer was in the best interest of the infant. An air ambulance transported the infant to the trauma center that was located approximately 320 km (200 miles) from the transferring hospital. Following arrival, the physicians diagnosed the infant's condition as grave and he expired approximately 28 hours following the crash. Although organ donation had been agreed upon by the parents, the local coroner ruled against the donation in order to perform an autopsy for the accidental death.

LEFT REAR PASSENGER

Age/Sex:	4 year old female
Height:	111.8 cm (44.0")
Weight:	20.4 kg (45.0 lb.)
Manual Restraint System Usage:	Seated in a booster seat and restrained by the vehicle's 3-point lap and shoulder belt system
Usage Source:	Driver interview, vehicle inspection
Mode of Transport From Scene:	Private vehicle
Medical Treatment:	Not injured

LEFT REAR PASSENGER INJURIES

Injury	Injury Severity (AIS-90)	Injury Mechanism
Not injured	N/A	N/A

LEFT REAR PASSENGER KINEMATICS

The left rear child occupant of the 1995 Saturn was seated in a child booster seat and was properly restraint by the vehicle's 3-point lap and shoulder belt system. She responded to the crash force by moving to her left and forward and loaded the belt webbing which held her in position and prevented her from contact with interior components. As a result of restraint usage, the child occupant was not injured. She came to rest in a normal posture in the left rear position of the vehicle.

RIGHT REAR PASSENGER

Age/Sex:	2 year old male
Height:	88.9 cm (35.0")
Weight:	16.3 kg (36.0 lb.)
Manual Restraint Usage:	Restrained in a forward facing Fisher Price convertible child restraint. The child restraint was properly restrained with the vehicle's 3-point lap and shoulder belt system.
Usage Source:	Driver interview, vehicle inspection
Mode of Transport From Scene:	Private Vehicle
Medical Treatment:	Not injured

RIGHT REAR PASSENGER INJURIES

Injury	Injury Severity (AIS-90)	Injury Mechanism
Not injured	N/A	N/A

RIGHT REAR PASSENGER KINEMATICS

The right rear child occupant was properly restrained in a forward facing Fisher Price convertible-type child restraint. The child restraint was secured by the vehicle's manual 3-point lap and shoulder belt system. At impact, the child responded to the 9 o'clock impact force and loaded the integral 3-point belt system of the child restraint which held him in position and mitigated the risk of injury.

FMVSS 208

An additional test was performed with the crash involved 1995 Saturn SL1 for Federal Motor Vehicle Safety Standard 208 regarding the vehicle's eligibility for a cutoff switch for the passenger side air bag system. This procedure involved the horizontal measurement of the distance between the rear surface of the front seat back and the forward surface of the rear seat back measured at the highest point of the rear seat cushion. FMVSS 208 would allow for a cutoff switch in vehicles where this horizontal measurement is less than 720 mm (28.3").

The manually operated passenger seat track of the Saturn consisted of a dual rail configuration with a series of locking notches in the track assembly. The standard required the seat track to be placed in the mid track position, therefore the track system was adjusted to a point with 9 notches fore and aft of the locking pawl. The seat back support was reclined to the first adjustment point which yielded a recline measurement of 12 degrees which was 2 degrees rearward of the nominal position. These are the manufacturers nominal design riding positions for FMVSS 208. The adjustable head restraint was elevated above the seat back

support and the post measured at an angle of 90 degrees to the ground. With the seattrack and seat back adjusted to these positions, several horizontal measurements were documented as noted above. The results of these measurement s are as follows:

Test 1

Level 1 - At the base of the rear seat cushion (*highest point*), a horizontal measurement of 724 mm (28.5") was recorded between the seat back supports.

Level 2 - At the mid seat back level, a horizontal measurement of 775 cm (30.5") was recorded between the seat back supports.

Level 3 - At the top surface of the front seat back support, a horizontal measurement of 775 mm (30.5") was recorded between the seat backs. (This measurement is provided as Photograph No.87).

A second set of measurements were. recorded with the right front seat back reclined to the third adjustment position from vertical. In this position, the head restraint post was 10 degrees rearward of vertical. The results of the measurements are as follows:

Test 2

Level 1 - At the base of the rear seat cushion (*highest point*), a horizontal measurement of 701 mm (27.6") was recorded between the seat back supports.

Level 2 - At the mid seat back level, a horizontal measurement of 711 mm (28.0") was recorded between the seat back supports.

Level 3 - At the top surface of the front seat back support, a horizontal measurement of 686 mm (27.0") was recorded between the seat back supports. (This measurement is provided as Photograph No. 88).

Based on the results of the Level 1 measurement in Test 1, which closely resembles the nominal riding position for this vehicle, the horizontal measurement of 724 mm exceeded the requirement of <720 mm, therefore this vehicle does not qualify for a passenger side air bag cutoff switch under FMVSS 208.

ATTACHMENT A

Color Prints



1. Pre-crash trajectory of the 1995 Saturn SL.



2. Trajectory of the Saturn at 30 m (100') prior to impact.



3. Trajectory of the Saturn at 15 m (50') prior to impact.



4. Driver's obscured view of the approach of vehicle #2 at 15 m (50') prior to impact.



5. Front wheel brake lock-up of the Saturn SL prior to impact.



6. Point of impact.



7. Post-impact rotational trajectory of the Saturn to final rest.



8. Final rest position of the Saturn, approximately 180 degrees opposite of its initial trajectory.



9. Pre-crash trajectory of the Ford pickup truck.



10. Pre-crash trajectory of the Ford pickup truck at 30 m (100') prior to impact.



11. Driver #2's obstructed view of the approach of the Saturn at 30 m (100') and approximately 2.5 seconds prior to impact.



12. Trajectory of the Saturn at 15 m (50') prior to impact.



13. Impact induced tire marks from the Ford pickup.



14. Left front tire contact of the Ford pickup truck against the mountable curb.



15. Final rest position of the Ford pickup truck.



16. Lookback view of the Ford pickup truck's path of travel.



17. Frontal view of the impact damage to the Saturn SL.



18. Additional frontal view of the damage pattern.

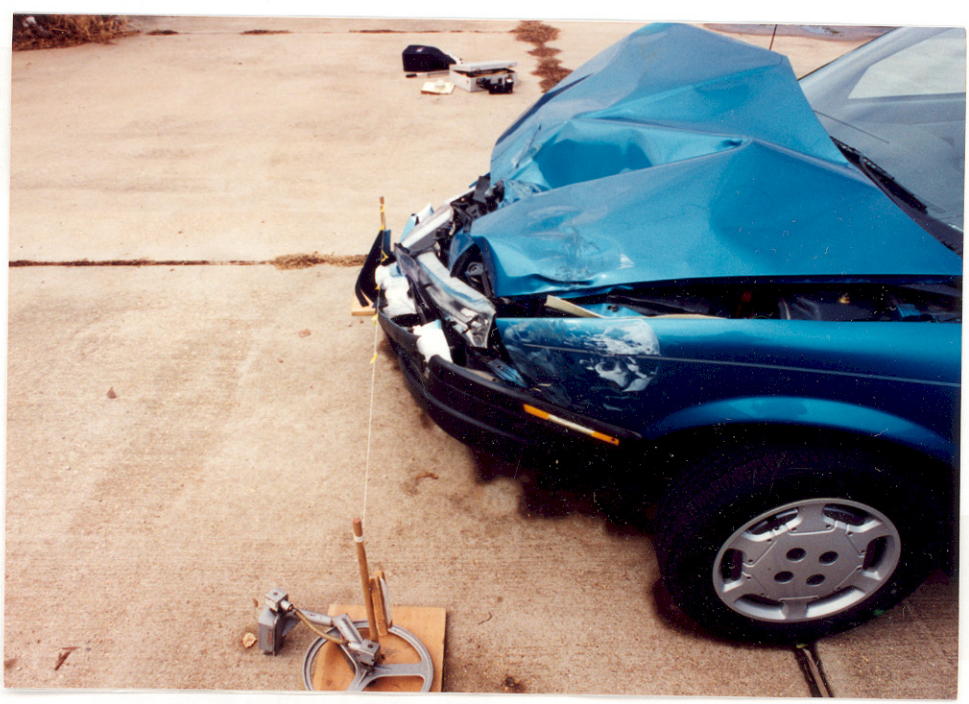




19. & 20. Longitudinal views of the Saturn documenting the lateral displacement.



21. Left front three-quarter view of the 1995 Saturn SL.



22. Perpendicular view of the frontal plane documenting the extent of crush.



23. Left side view of the Saturn SL.



24. Left rear three-quarter view.



25. Right rear three-quarter view.



26. Right side view of the 1995 Saturn SL.



27. Right front three-quarter view of the Saturn SL.



28. Right front perpendicular view documenting the crush profile.

BEST AVAILABLE



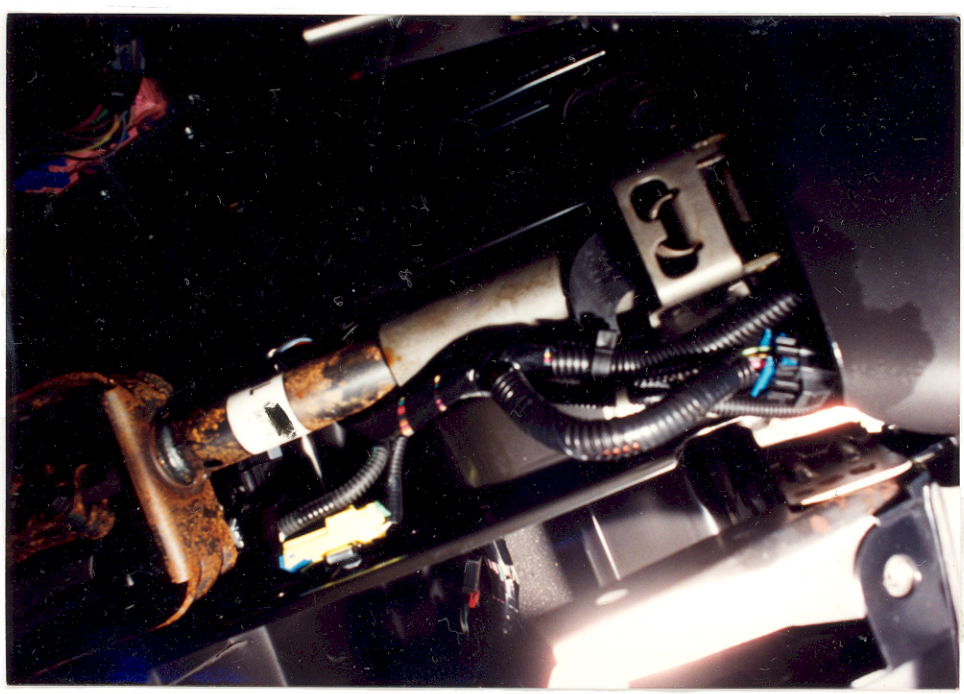
29. Overall view of the deployed driver's side air bag.



30. Profile view of the driver's adjusted seat track position and the manual belt system.



31. Driver knee scuffs to the knee bolster.

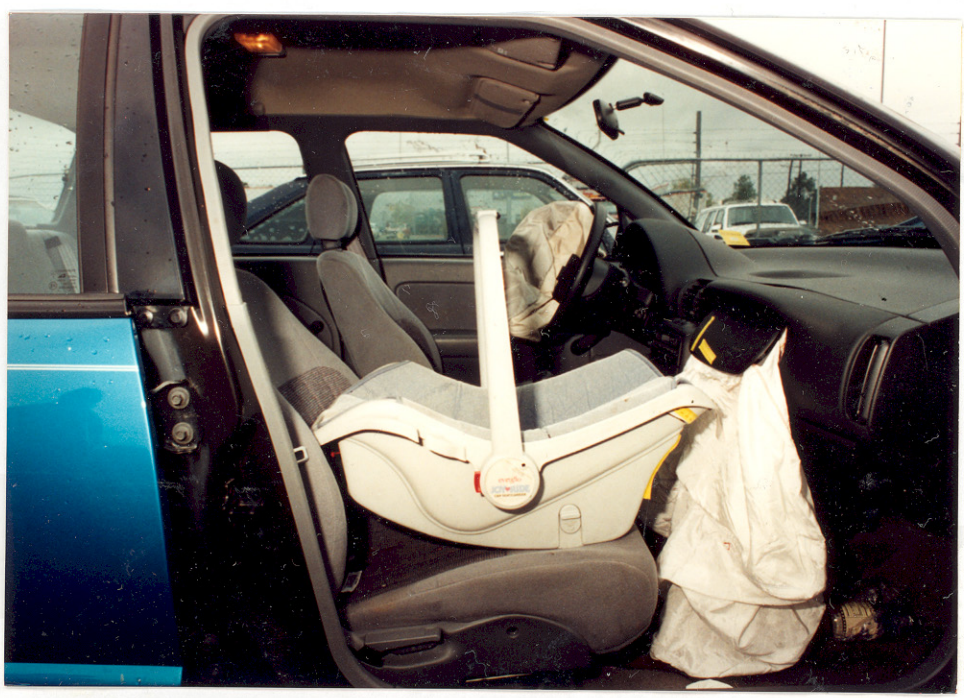


32. Saturn's energy absorbing steering column; no compression.

BEST AVAILABLE



33. Placement of the rearward facing child restraint in the right front seat position.



34. Additional view of the position of the child restraint with respect to the passenger side air bag.

BEST AVAILABLE



35. Close-up view of the position of the rearward facing child restraint.



36. Close-up view of the child restraint with respect to the passenger side module cover flap.

BEST AVAILABLE



37. Overhead view of the child restraint position and the deployed air bag.



38. Simulated view of the rearward rotation of the child restraint which resulted from deployment.

BEST AVAILABLE





39. & 40. Overall views of the deployed passenger side air bag.

BEST AVAILABLE



41. White fabric-type scuff marks on the face of the passenger side module cover flap.



42. Abrasions to the face of the passenger side air bag.

BEST AVAILABLE

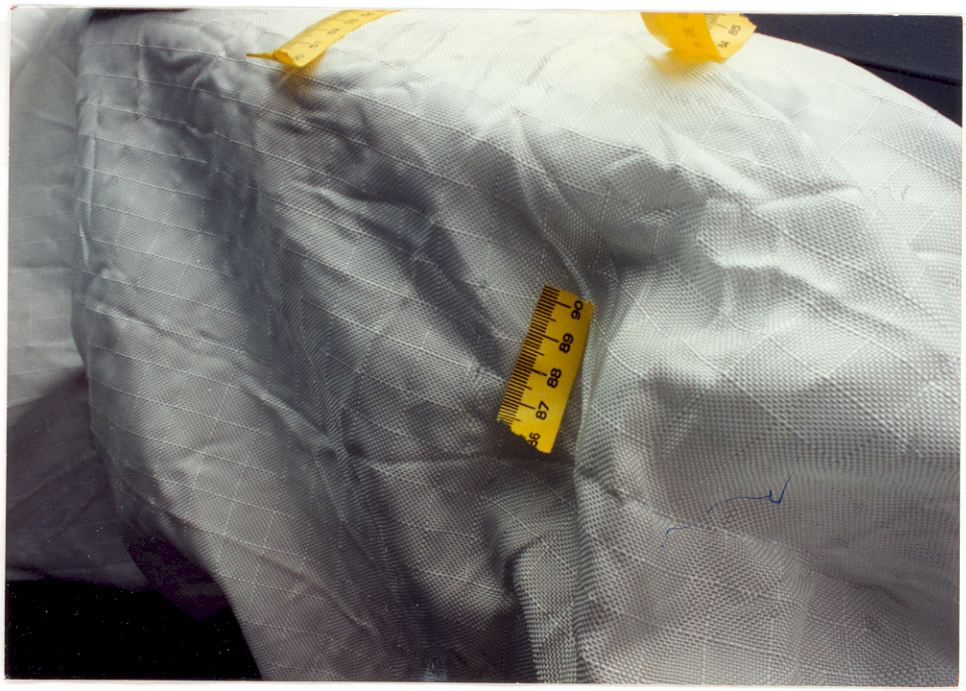


43. Blackish vinyl-type transfer to the face of the bag 11.4-25.4 cm below the horizontal seam.



44. Close-up view of the black vinyl-type transfers.

BEST AVAILABLE



45. Abraded passenger side air bag fabric.



46. Right front passenger seat with manual belt system buckled.

BEST AVAILABLE



47. Blue fabric transfer on shoulder belt webbing of the right front belt system.



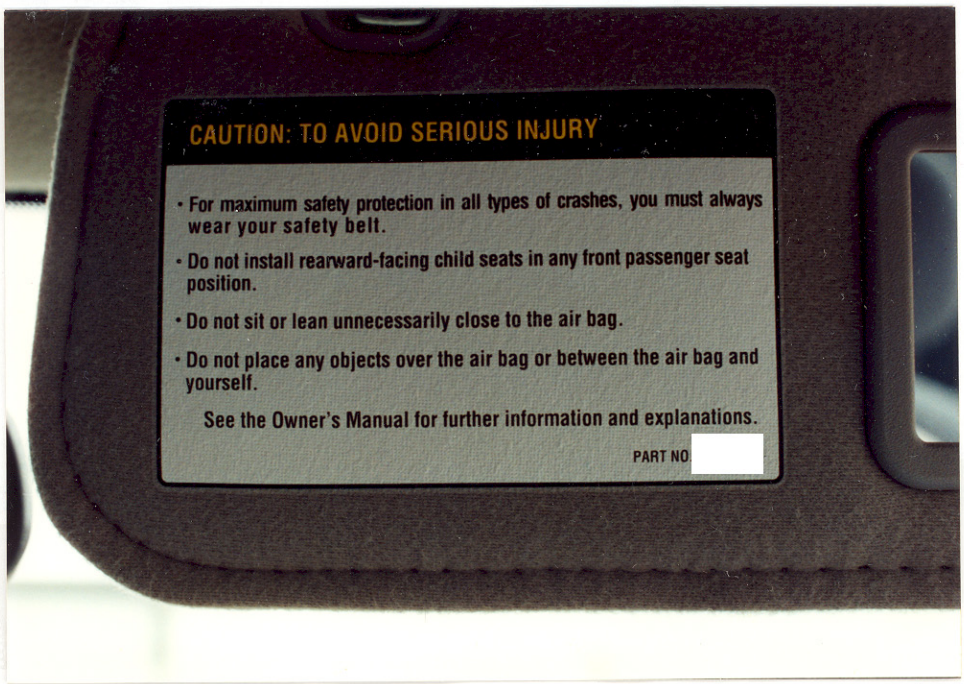
48. Close-up view of the fabric transfer on the belt webbing.



49. Caution label on the right front lap belt webbing.



50. Advisory label of the passenger compartment side of the sunvisors.



51. Caution label on the top side of the sunvisors.



52. Frontal view of the Evenflo JOYRIDE child restraint removed from vehicle.



53. Close-up view of the manufacturer logo and center buckle assembly.



54. Recessed buckle release mechanism.

BEST AVAILABLE



55. 3-point restraint harness with the chest clip attached.



56. Left side view of the Evenflo Joyride infant restraint.

BEST AVAILABLE

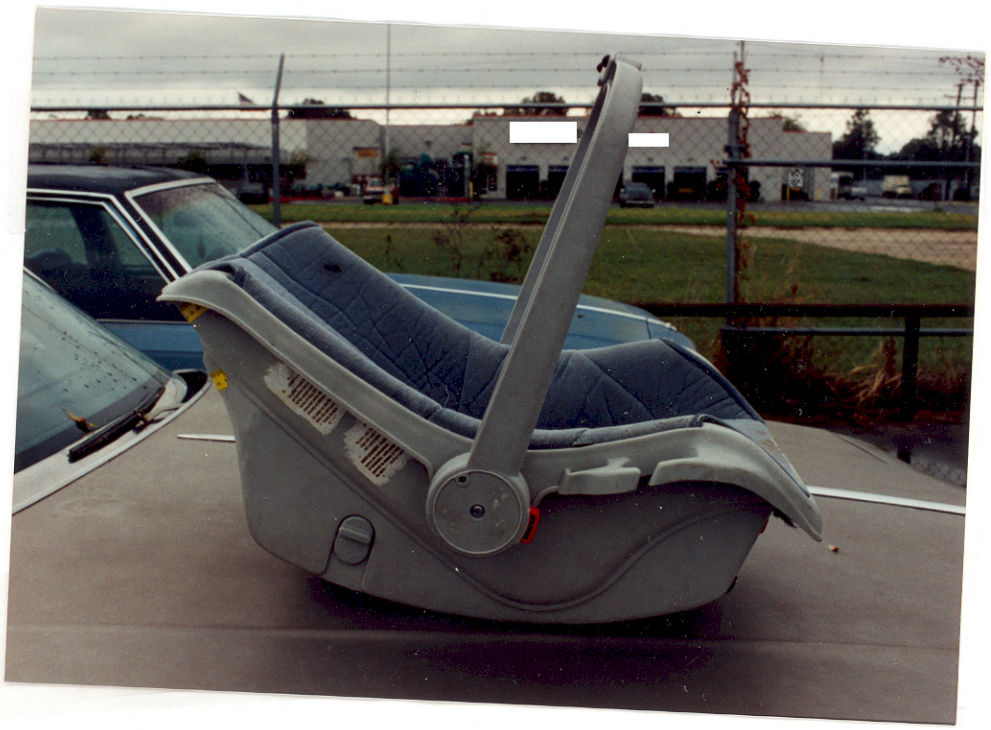


57. Identification label on left side of restraint.



58. Rear view of the restraint with the carrying handle in the upright position.

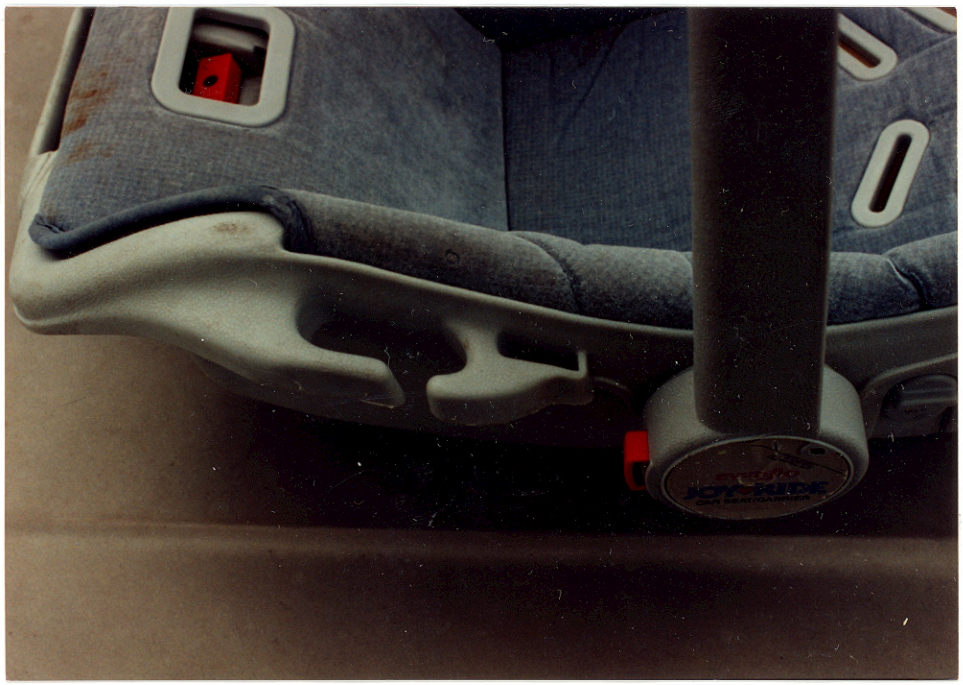
BEST AVAILABLE



59. Right side view of the infant restraint.



60. Worn condition labels on the right side of the restraint.



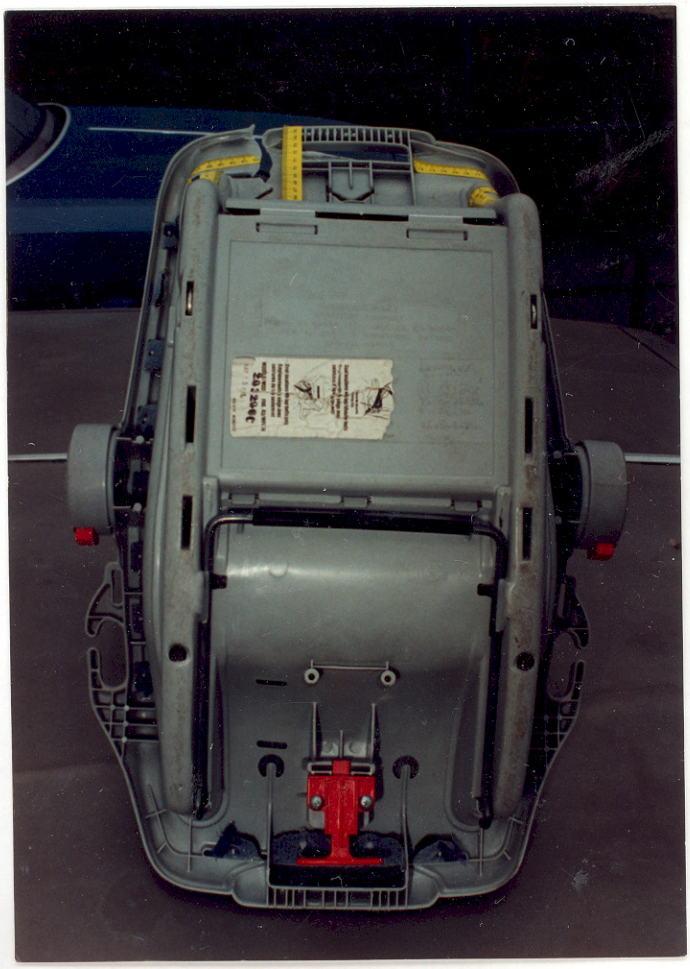


61. & 62. Left and right vehicle seat belt attachment points.

BEST AVAILABLE



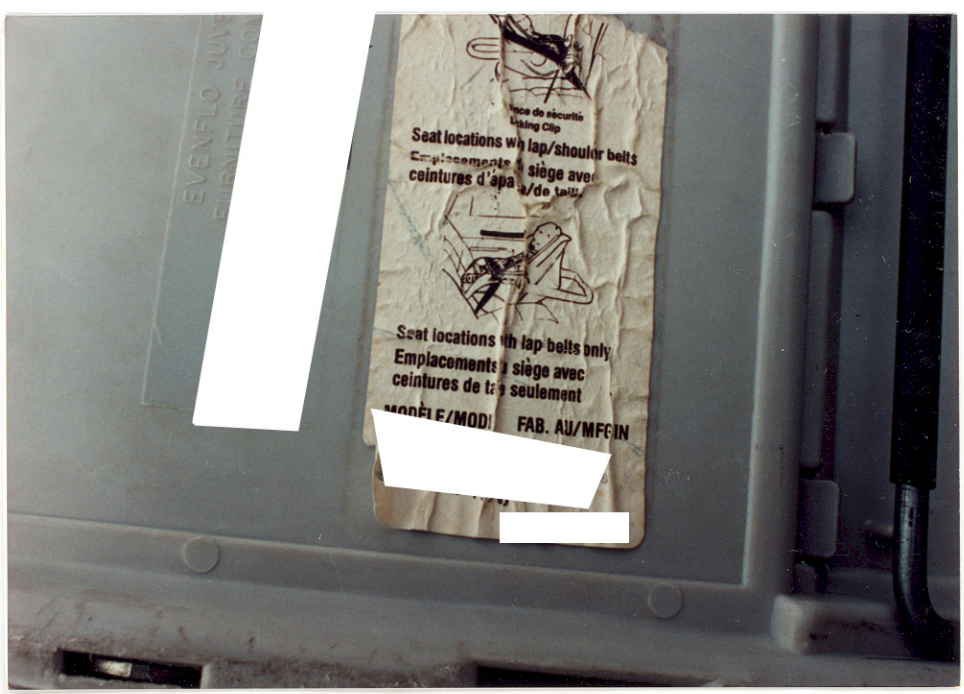
63. Integral shopping cart clip mechanism.



64. Bottom view of the Evenflo Joyride infant restraint.



65. Manufacturer identification embossed on the bottom of the restraint.



66. Adhesive identification label affixed to the bottom of the restraint.

BEST AVAILABLE

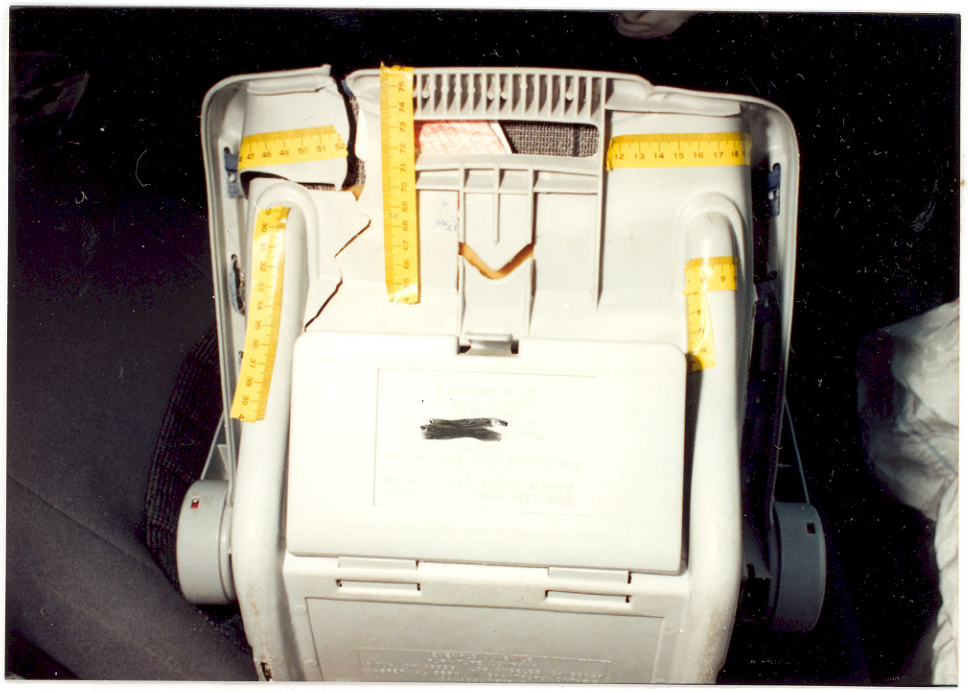


67. Integral storage compartment cover door with instructional data.

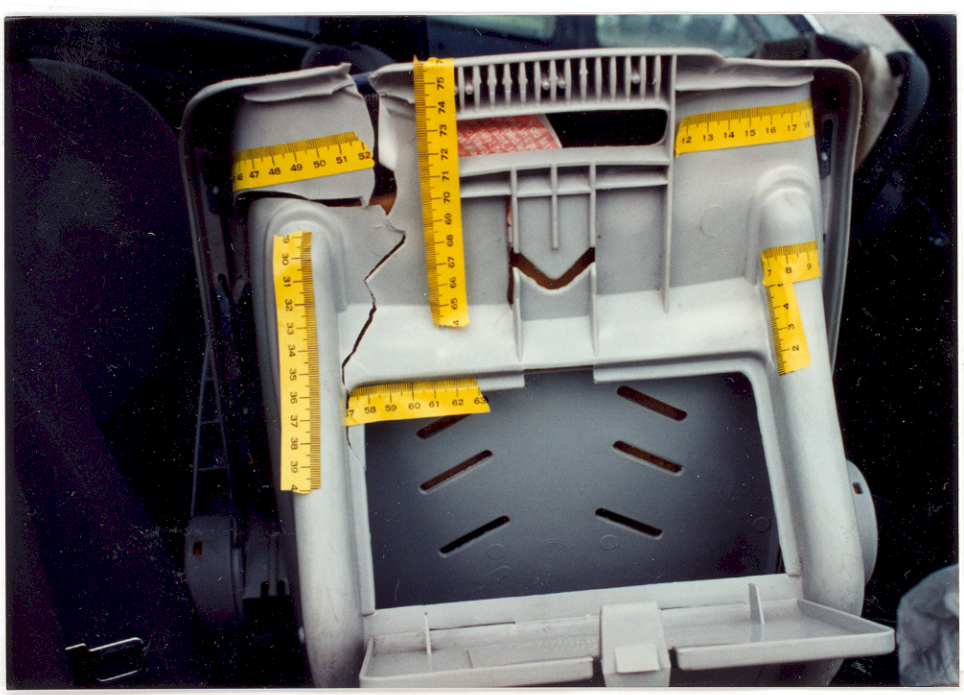


68. Worn cushion fabric on inside surface with foam pad overlying the fracture points.

BEST AVAILABLE



69. Overall view of the damage to the rear of the restraint that resulted from air bag contact.

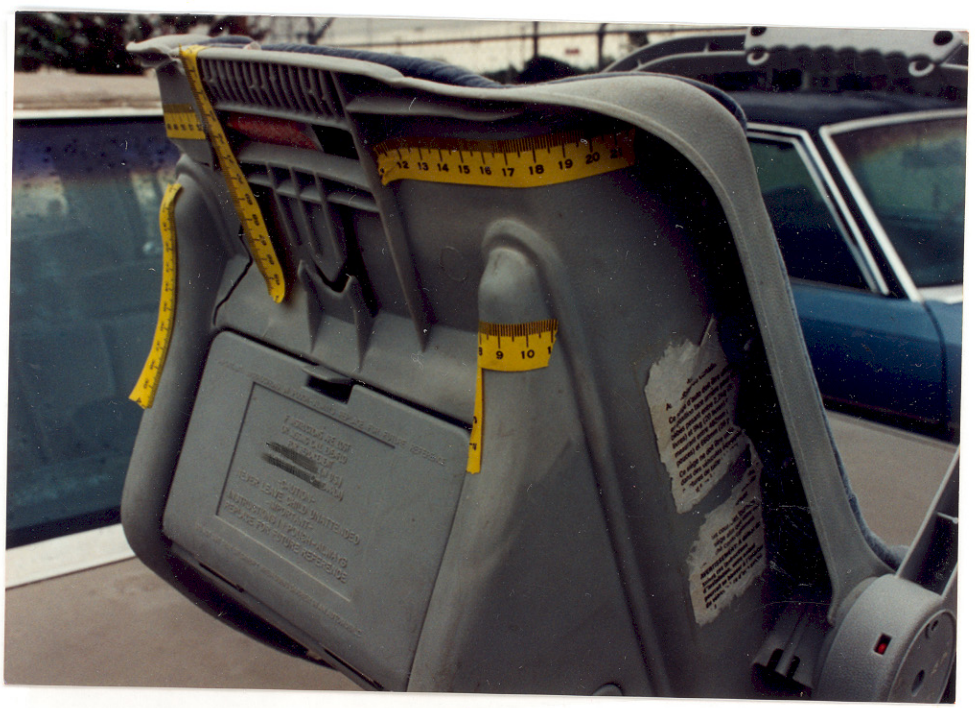


70. Close-up view of the damage to the shell of the restraint.

BEST AVAILABLE



71. Damage to the upper left corner area of the restraint.



72. Damage as viewed from the right rear corner of the restraint.

BEST AVAILABLE



73. Fracture through the shell at the upper left aspect of the restraint.



74. Fracture at the right reinforcement point.



75. Frontal view of the Ford F-100 pickup truck.



76. Close-up view of the front bumper crush.



77. Left front three-quarter view.



78. Left side view of the Ford F-100 pickup truck.



79. Right rear three-quarter view.



80. Right side view of the Ford F-100 pickup truck.



81. Close-up view of the corner impact damage and rearward displacement of the right front axle.



82. Close-up view of the right front corner area.



83. Direct contact damage to the right front bumper corner.



84. Perpendicular view documenting the extent of frontal crush.



85. Aftermarket interior modifications to the Ford F-100 pickup truck.

BEST AVAILABLE

FMVSS 208
PASSENGER SIDE AIR BAG CUT-OFF SWITCH TEST RESULTS



86. Overall view of the rear seat area.



87. Upper (Level 3) measurement results, 775 mm (30.5")
with seat back support adjusted to the first recline position.

BEST AVAILABLE



88. Results of second test procedure with the front seat back support adjusted to the third recline position, 686 mm (27.0").

ATTACHMENT B:

NASS Vehicle Forms

U.S. Department of Transportation

National Highway Traffic Safety Administration

GENERAL VEHICLE FORM

NATIONAL ACCIDENT SAMPLING SYSTEM
CRASHWORTHINESS DATA SYSTEM

1. ~~Primary Sampling Unit Number~~ ____
2. Case Number - Stratum 95-22
3. Vehicle Number 01

VEHICLE IDENTIFICATION

4. Vehicle Model Year 95
 Code the last two digits of the model year
 (99) Unknown

5. Vehicle Make (specify): 24
 SATURN
 Applicable codes are found in your NASS Data Collection, Coding and Editing Manual.
 (99) Unknown

6. Vehicle Model (specify): 001
 SL1 4 DR. SEDAN
 Applicable codes are found in your NASS Data Collection, Coding and Editing Manual.
 (999) Unknown

7. Body Type 04
 Note: Applicable codes may be found on the back of this page.

8. Vehicle Identification Number

 1G8ZG5288SZ_____
 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
 Left justify; Slash zeros and letter Z (Ø and ~~Z~~)
 No VIN—Code all zeros Unknown—Code all nines

9. Vehicle Special Use (This Trip) 0
 (0) No special use
 (1) Taxi
 (2) Vehicle used as school bus
 (3) Vehicle used as other bus
 (4) Military
 (5) Police
 (6) Ambulance
 (7) Fire truck or car
 (8) Other (specify): _____
 (9) Unknown

OFFICIAL RECORDS

10. Police Reported Vehicle Disposition 1
 (0) Not towed due to vehicle damage
 (1) Towed due to vehicle damage
 (9) Unknown

11. Police Reported Travel Speed 026
 Code to the nearest kmph (NOTE: 000 means less than 0.5 kmph)
 (160) 159.5 kmph and above
 (999) Unknown
 Minimum speed of 16 mph
 16 mph X 1.6093 = ___ kmph

12. Speed Limit 040
 (000) No statutory limit
 Code posted or statutory speed limit in kmph
 (999) Unknown

 25 mph X 1.6093 = 040 kmph

13. Police Reported Alcohol Presence For Driver 0
 (0) No alcohol present
 (1) Yes alcohol present
 (7) Not reported
 (8) No driver present
 (9) Unknown

14. Alcohol Test Result For Driver 00
 Code actual value (decimal implied before first digit—0.xx)
 (95) Test refused
 (96) None given
 (97) AC test performed, results unknown
 (98) No driver present
 (99) Unknown

 Source: _____

15. Police Reported Other Drug Presence For Driver 7
 (0) No other drug(s) present
 (1) Yes other drug(s) present
 (7) Not reported
 (8) No driver present
 (9) Unknown

16. Other Drug Specimen Test Result For Driver 0
 (0) No specimen test given
 (1) Drug(s) not found in specimen
 (2) Drug(s) found in specimen, (specify):

 (3) Specimen test given, results unknown or not obtained
 (8) No driver present
 (9) Unknown if specimen test given

17. Driver's Zip Code 99999
 (00001) Driver not a resident of U.S. or territories
 _____ Code actual 5-digit zip code
 (99998) No driver present
 (99999) Unknown

18. Driver's Race/Ethnic Origin 1
 (1) White (non-Hispanic)
 (2) Black (non-Hispanic)
 (3) White (Hispanic)
 (4) Black (Hispanic)
 (5) American Indian, Eskimo or Aleut
 (6) Asian or Pacific Islander
 (7) Other (specify):

 (8) No driver present
 (9) Unknown

HS Form 435 (Rev. 1/95)

CODES FOR BODY TYPE

CDS APPLICABLE VEHICLES

Automobiles

(01) Convertible (excludes sun-roof, t-bar)
(02) 2-door sedan, hardtop, coupe
(03) 3-door/2-door hatchback
(04) 4-door sedan, hardtop
(05) 5-door/4-door hatchback
(06) Station wagon (excluding van and truck based)
(07) Hatchback, number of doors unknown
(08) Other automobile type (specify):

(09) Unknown automobile type

Automobile Derivatives

(10) Auto based pickup (includes El Camino, Caballero, Ranchero, Brat, and Rabbit pickup)
(11) Auto based panel (cargo station wagon, auto based ambulance/hearse)
(12) Large limousine - more than four side doors or stretched chassis
(13) Three-wheel automobile or automobile derivative

Utility Vehicles (≤ 4,500 kgs GVWR)

(14) Compact utility (Jeep CJ-2 - CJ-7, Scrambler, Golden Eagle, Renegade, Laredo, Wrangler, Cherokee [84 and after], Dispatcher, Raider, Bronco II, Bronco [76 and before], Explorer, S-10 Blazer, Geo Tracker, Bravada, S-15 Jimmy, Thing, Pathfinder, Trooper, Trooper II, Rodeo, Amigo, Navajo, 4-Runner, Montero, Passport, Samurai, Sidekick, Rocky)
(15) Large utility (includes Jeep Cherokee [83 and before], Ramcharger, Trailduster, Bronco-fullsize [78 and after], fullsize Blazer, fullsize Jimmy, Hummer, Landcruiser, Rover, Scout, Yukon)
(16) Utility station wagon (Chevy Suburban, GMC Suburban, Travelall, Grand Wagoneer, includes suburban limousine)
(19) Utility, unknown body type

Van Based Light Trucks (≤ 4,500 kgs GVWR)

(20) Minivan (Town and Country, Caravan, Grand Caravan, Voyager, Grand Voyager, Mini-Ram, Vista, Aerostar, Windstar, Villager, Lumina APV, Trans Sport, Silhouette, Astro, Safari, Toyota Van, Toyota Minivan, Previa, Nissan Minivan, Quest, Mitsubishi Minivan, Expo Wagon, Vanagon/Camper.)
(21) Large van (B150-B350, Sportsman, Royal, Maxiwagon, Ram, Tradesman, Voyager [83 and before], E150-E350, Econoline, Clubwagon, Chateau, G10-G30, Chevy Van, Beauville, Sport Van, G15-G35, Rally Van, Vandura.)
(22) Step van or walk-in van (≤ 4,500 kgs GVWR)
(23) Van based motorhome (≤ 4,500 kgs GVWR)
(24) Van based school bus (≤ 4,500 kgs GVWR)
(25) Van based other bus (≤ 4,500 kgs GVWR)
(28) Other van type (Hi-Cube Van, Kary) (specify):

(29) Unknown van type

Light Conventional Trucks (Pickup style cab, ≤ 4,500 kgs GVWR)

(30) Compact pickup (D50, Colt P/U, Ram 50, Dakota, Arrow Pickup [foreign], Ranger, Courier, S-10 , T-10, LUV, S-15, T-15, Sonoma, Datsun/Nissan Pickup, P'up, Mazda Pickup, Toyota Pickup, Mitsubishi Pickup)
(31) Large Pickup (Jeep Pickup, Comanche, Ram Pickup, D100-D350, W100-W350, F100-F350, C10-C35, K10-K35, R10-R35, V10-V35, Silverado, Sierra, R100-R500, T100)
(32) Pickup with slide-in camper
(33) Convertible pickup
(39) Unknown pickup style light conventional truck type

Other Light Trucks (≤ 4,500 kgs GVWR)

(40) Cab chassis based (includes rescue vehicles, light stake, dump, and tow truck)
(41) Truck based panel
(42) Light truck based motorhome (chassis mounted)
(45) Other light conventional truck type
(48) Unknown light truck type
(49) Unknown light vehicle type (automobile, utility, van, or light truck)

OTHER VEHICLES

Buses (Excludes Van Based)

(50) School bus (designed to carry students, not cross country or transit)
(58) Other bus type (e.g., transit, intercity, bus based motorhome) (specify):

(59) Unknown bus type

Medium/Heavy Trucks (> 4,500 kgs GVWR)

(60) Step van (> 4,500 kgs GVWR)
(61) Single unit straight truck (4,500 kgs < GVWR ≤ 8,850 kgs)
(62) Single unit straight truck (8,850 kgs < GVWR ≤ 12,000 kgs)
(63) Single unit straight truck (> 12,000 kgs GVWR)
(64) Single unit straight truck, GVWR unknown
(65) Medium/heavy truck based motorhome
(67) Truck-tractor with no cargo trailer
(68) Truck-tractor pulling one trailer
(69) Truck-tractor pulling two or more trailers
(70) Truck-tractor (unknown if pulling trailer)
(78) Unknown medium/heavy truck type
(79) Unknown truck type (light/medium/heavy)

Motored Cycles (Does Not Include All-Terrain Vehicles/Cycles)

(80) Motorcycle
(81) Moped (motorized bicycle)
(82) Three-wheel motorcycle or moped
(88) Other motored cycle (minibike, motorscooter) (specify):_____
(89) Unknown motored cycle type

Other Vehicles

(90) ATV (All-Terrain Vehicle) and ATC (All-Terrain Cycle)
(91) Snowmobile
(92) Farm equipment other than trucks
(93) Construction equipment other than trucks
(97) Other vehicle type
(99) Unknown body type

PRECRASH ENVIRONMENTAL DATA

19. Relation To Interchange Or Junction — 2
(0) Non-interchange area and non-junction
(1) Interchange area related

Non-Interchange junctions
(2) Intersection related
(3) Driveway, alley access related
(4) Other junction (specify) _____
(5) Unknown type of junction
(9) Unknown

20. Trafficway Flow — 0
(0) Not physically divided (two way traffic)
(1) Divided trafficway-median strip without positive barrier
(2) Divided trafficway-median strip with positive barrier
(3) One way traffic
(9) Unknown

21. Number Of Travel Lanes — 2
(1) One
(2) Two
(3) Three
(4) Four
(5) Five
(6) Six
(7) Seven or more
(9) Unknown

22. Roadway Alignment — 1
(1) Straight
(2) Curve right
(3) Curve left
(9) Unknown

23. Roadway Profile — 1
(1) Level
(2) Uphill grade (>2%)
(3) Hill crest
(4) Downhill grade (>2%)
(5) Sag
(9) Unknown

24. Roadway Surface Type — 2
(1) Concrete PRIOR TO POI (per manual)
(2) Bituminous (asphalt)
(3) Brick or block
(4) Slag, gravel, or stone
(5) Dirt
(8) Other (specify): _____
(9) Unknown

25. Roadway Surface Condition — 1
(1) Dry
(2) Wet
(3) Snow or slush
(4) Ice
(5) Sand, dirt, or oil
(8) Other (specify): _____
(9) Unknown

26. Light Conditions — 1
(1) Daylight
(2) Dark
(3) Dark, but lighted
(4) Dawn
(5) Dusk
(9) Unknown

27. Atmospheric Conditions — 0
(0) No adverse atmospheric-related driving conditions
(1) Rain
(2) Sleet/hail
(3) Snow
(4) Fog
(5) Rain and fog
(6) Sleet and fog
(7) Other (e.g., smog, smoke, blowing sand or dust, etc.) (specify): _____
(9) Unknown

28. Traffic Control Device — 1
(0) No traffic control(s)
(1) Traffic control signal (not RR crossing)

Regulatory
(2) Stop sign
(3) Yield sign
(4) School zone sign
(5) Other regulatory sign (specify): _____
(6) Warning sign (not RR crossing)
(7) Unknown sign
(8) Miscellaneous/other controls including RR controls (specify): _____
(9) Unknown

29. Traffic Control Device Functioning — 2
(0) No traffic control device
(1) Traffic control device not functioning (specify): _____
(2) Traffic control device functioning properly
(9) Unknown

PRECRASH DRIVER RELATED DATA

30. Driver's Distraction/Inattention To Driving (Prior To Recognition Of Critical Event) 03
(00) No driver present
(01) Attentive or not distracted
(02) Looked but did not see

Distractions
(03) By other occupant(s), (specify): REAR SEATED CHILDREN
(04) By moving object in vehicle (specify):
(05) While talking or listening to cellular phone (specify location and type of phone):
(06) While dialing cellular phone (specify location and type of phone):
(07) While adjusting climate controls
(08) While adjusting radio, cassette, CD (specify):
(09) While using other device/object in vehicle (specify):
(10) Sleepy or fell asleep
(11) Distracted by outside person, object, or event (specify):
(12) Eating or drinking
(13) Smoking related
(97) Distracted/inattentive, details unknown
(98) Other, distraction (specify):
(99) Unknown

31. Pre-Event Movement (Prior to Recognition of Critical Event) 01
(00) No driver present
(01) Going straight
(02) Decelerating in traffic lane
(03) Accelerating in traffic lane
(04) Starting in traffic lane
(05) Stopped in traffic lane
(06) Passing or overtaking another vehicle
(07) Disabled or parked in travel lane
(08) Leaving a parking position
(09) Entering a parking position
(10) Turning right
(11) Turning left
(12) Making a U-turn
(13) Backing up (other than for parking position)
(14) Negotiating a curve
(15) Changing lanes
(16) Merging
(17) Successful avoidance maneuver to a previous critical event
(97) Other (specify):
(99) Unknown

32. Critical Precrash Event 17
This Vehicle Loss of Control Due To:
(01) Blow out or flat tire
(02) Stalled engine
(03) Disabling vehicle failure (e.g., wheel fell off) (specify):
(04) Non-disabling vehicle problem (e.g., hood flew up) (specify):
(05) Poor road conditions (puddle, pot hole, ice, etc.) (specify):
(06) Traveling too fast for conditions
(08) Other cause of control loss (specify):
(09) Unknown cause of control loss

This Vehicle Traveling
(10) Over the lane line on left side of travel lane
(11) Over the lane line on right side of travel lane
(12) Off the edge of the road on the left side
(13) Off the edge of the road on the right side
(14) End departure
(15) Turning left at intersection
(16) Turning right at intersection
(17) Crossing over (passing through) intersection
(18) This vehicle decelerating
(19) Unknown travel direction

Other Motor Vehicle In Lane
(50) Other vehicle stopped
(51) Traveling in same direction with lower steady speed
(52) Traveling in same direction while decelerating
(53) Traveling in same direction with higher speed
(54) Traveling in opposite direction
(55) In crossover
(56) Backing
(59) Unknown travel direction of other motor vehicle in lane

Other Motor Vehicle Encroaching Into Lane
(60) From adjacent lane (same direction)—over left lane line
(61) From adjacent lane (same direction)—over right lane line
(62) From opposite direction—over left lane line
(63) From opposite direction—over right lane line
(64) From parking lane
(65) From crossing street, turning into same direction
(66) From crossing street, across path
(67) From crossing street, turning into opposite direction
(68) From crossing street, intended path not known
(70) From driveway, turning into same direction
(71) From driveway, across path
(72) From driveway, turning into opposite direction
(73) From driveway, intended path not known
(74) From entrance to limited access highway
(78) Encroachment by other vehicle—details unknown

Pedestrian, Pedalcyclist, or Other Nonmotorist
(80) Pedestrian in roadway
(81) Pedestrian approaching roadway
(82) Pedestrian—unknown location
(83) Pedalcyclist or other nonmotorist in roadway (specify):
(84) Pedalcyclist or other nonmotorist approaching roadway, (specify):
(85) Pedalcyclist or other nonmotorist—unknown location (specify):

Object or Animal
(87) Animal in roadway
(88) Animal approaching roadway
(89) Animal—unknown location
(90) Object in roadway
(91) Object approaching roadway
(92) Object—unknown location
(98) Other critical precrash event (specify):
(99) Unknown

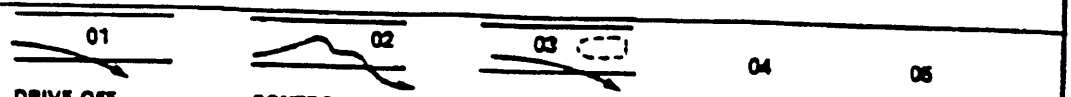
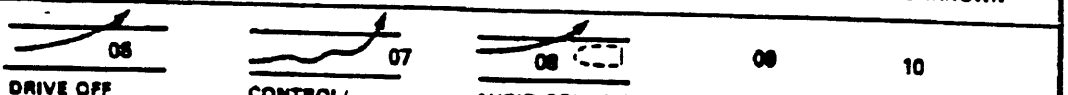
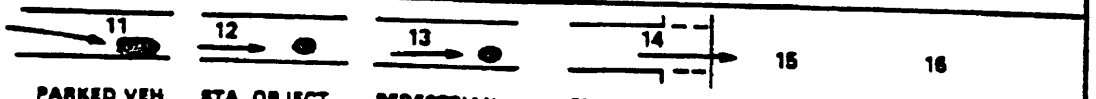
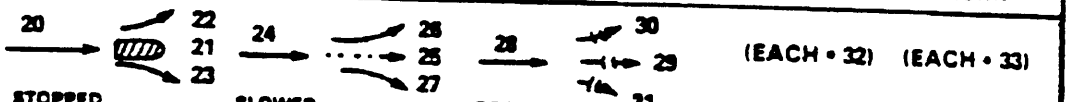
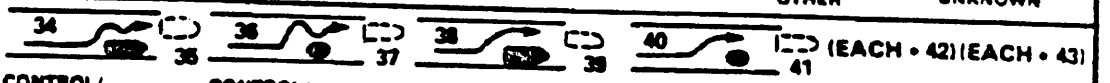
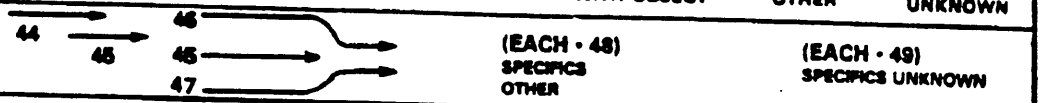
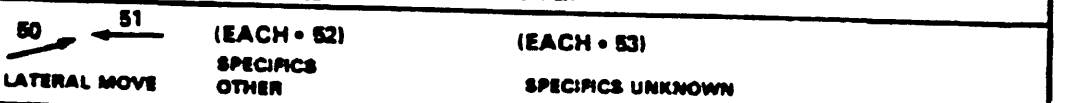
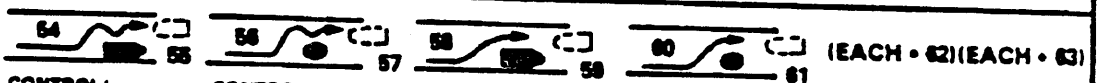
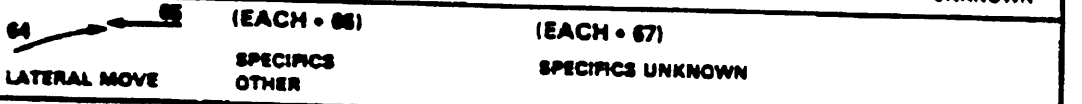
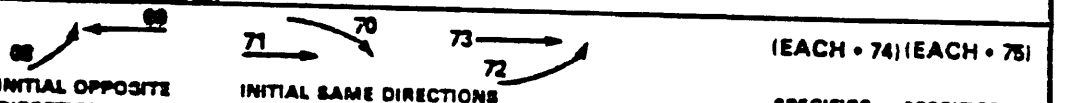
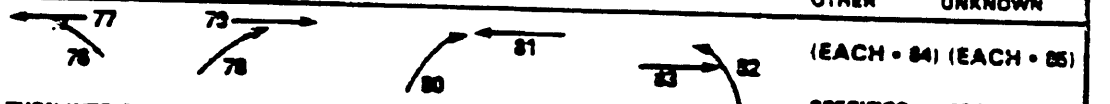
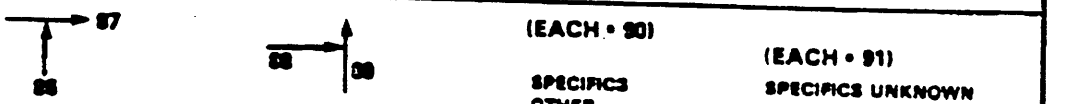
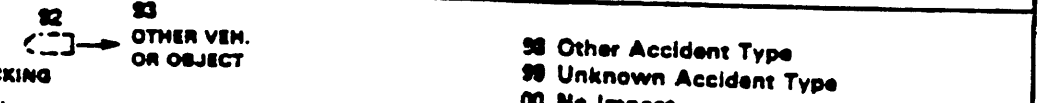
33. Attempted Avoidance Maneuver 03
(00) No driver present
(01) No avoidance maneuver
(02) Braking (no lockup)
(03) Braking (lockup)
(04) Braking (lockup unknown)
(05) Releasing brakes
(06) Steering left
(07) Steering right
(08) Braking and steering left
(09) Braking and steering right
(10) Accelerating
(11) Accelerating and steering left
(12) Accelerating and steering right
(98) Other action (specify): _____
(99) Unknown

34. Pre-Impact Stability 1
(0) No driver present
(1) Tracking
(2) Skidding longitudinally—rotation less than 30 degrees
(3) Skidding laterally—clockwise rotation
(4) Skidding laterally—counterclockwise rotation
(7) Other vehicle loss-of-control (specify): _____
(9) Precrash stability unknown

35. Pre-Impact Location 1
(0) No driver present
(1) Stayed in original travel lane
(2) Stayed on roadway but left original travel lane
(3) Stayed on roadway, not known if left original travel lane
(4) Departed roadway
(5) Remained off roadway
(6) Returned to roadway
(7) Entered roadway
(9) Unknown

36. Accident Type 86
(Note: Applicable codes on back of this page)
(00) No impact
Code the number of the diagram that best describes the accident circumstance
(98) Other accident type (specify): _____
(99) Unknown

STOP HERE IF GV07 DOES NOT EQUAL 01 - 49

Category	Configuration	ACCIDENT TYPES (Includes Intent)
I Single Driver	A Right Roadside Departure	
	B Left Roadside Departure	
	C Forward Impact	
II Same Trafficway Same Direction	D Rear-End	
	E Forward Impact	
	F Sideswipe Angle	
III Same Trafficway Opposite Direction	G Head-On	
	H Forward Impact	
	I Sideswipe Angle	
IV Change Trafficway Vehicle Turning	J Turn Across Path	
	K Turn Into Path	
V Intersecting Paths (Vehicle Damage)	L Straight Paths	
VI Miscellaneous	M Backing Etc.	

BEST AVAILABLE COPY

OCCUPANT RELATED

37. Driver Presence in Vehicle: 1
(0) Driver not present
(1) Driver present
(9) Unknown

38. Number of Occupants This Vehicle: 04
(00-96) Code actual number of occupants for this vehicle
(97) 97 or more
(99) Unknown

39. Number of Occupant Forms Submitted: 01

AIR BAG RELATED

40. Is this an AOPS Vehicle? 1
(0) No (includes unknown)
(1) Yes - researcher determined
(2) VIN determined air bag system
(3) VIN determined automatic (passive) belts
(4) VIN determined air bag and automatic (passive) belts

41. Air Bag(s) Deployment, First Seat Frontal 6
(0) Not equipped or not available
(1) No air bags deployed

Single Air Bag Vehicle
(2) Driver air bag deployed
(3) Driver air bag, unknown if deployed

Multiple Air Bag Vehicle
(4) Driver side only deployed
(5) Passenger side only deployed
(6) Driver and passenger side deployed
(7) Driver and passenger side unknown if deployed
(8) Air bag(s) deployed, details unknown
(9) Unknown

42. Air Bag(s) Deployment, Other Than First Seat Frontal 0
(0) Not equipped with an "other" air bag
(1) Deployed during accident (as a result of impact)
(2) Deployed inadvertently just prior to accident
(3) Deployed, details unknown
(4) Deployed as a result of a noncollision event during accident sequence (e.g., fire, explosion, electrical)
(5) Unknown if deployed
(7) Nondeployed
(9) Unknown

Specify type of "other" air bag present: _____

VEHICLE WEIGHT ITEMS

43. Vehicle Curb Weight 1,050
____ Code weight to nearest 10 kilograms.
(045) Less than 450 kilograms
(610) 6,100 kilograms or more
(999) Unknown
2,314 lbs X .4536 = 1,050 kgs

Source: [redacted]

44. Vehicle Cargo Weight 0,010
____ Code weight to nearest 10 kilograms.
(000) Less than 5 kilograms
(450) 4,500 kilograms or more
(999) Unknown
20 lbs X .4536 = 0,009 kgs

Source: 3 CHILD RESTRAINTS

ROLLOVER DATA

45. Rollover 00
(00) No rollover (no overturning)

Rollover (primarily about the longitudinal axis)
(01-16) Code the number of quarter turns
(17) Rollover, 17 or more quarter turns (specify): _____
(98) Rollover--end-over-end (i.e., primarily about the lateral axis)
(99) Rollover (overturn), details unknown

46. Rollover Initiation Type 00
(00) No rollover
(01) Trip-over
(02) Flip-over
(03) Turn-over
(04) Climb-over
(05) Fall-over
(06) Bounce-over
(07) Collision with another vehicle
(08) Other rollover initiation type specify): _____
(98) Rollover--end-over-end
(99) Unknown rollover initiation type

47. Location of Rollover Initiation 0
(0) No rollover
(1) On roadway
(2) On shoulder—paved
(3) On shoulder—unpaved
(4) On roadside or divided trafficway median
(8) Rollover--end-over-end
(9) Unknown

48. Rollover Initiation Object Contacted 00
(Note: Applicable codes on back of page)

49. Location on Vehicle Where Initial Principal Tripping Force Is Applied 0
(0) No rollover
(1) Wheels/tires
(2) Side plane
(3) End plane
(4) Undercarriage
(5) Other location on vehicle (specify): _____
(6) Non-contact rollover forces (specify): _____
(8) Rollover--end-over-end
(9) Unknown

50. Direction of Initial Roll 0
(0) No rollover
(1) Roll right - primarily about the longitudinal axis
(2) Roll left - primarily about the longitudinal axis
(8) Rollover--end-over-end
(9) Unknown roll direction

CODES FOR ROLLOVER INITIATION OBJECT CONTACTED

(00) No rollover
(01-30) — Vehicle Number

Noncollision
(31) Turn-over — fall-over
(32) No rollover impact initiation (end-over-end)
(34) Jackknife

Collision With Fixed Object
(41) Tree (≤ 10 cm in diameter)
(42) Tree (> 10 cm in diameter)
(43) Shrubbery or bush
(44) Embankment

(45) Breakaway pole or post (any diameter)

Nonbreakaway Pole or Post
(50) Pole or post (≤ 10 cm in diameter)
(51) Pole or post (> 10 cm but ≤ 30 cm in diameter)
(52) Pole or post (> 30 cm in diameter)
(53) Pole or post (diameter unknown)

(54) Concrete traffic barrier
(55) Impact attenuator
(56) Other traffic barrier (includes guardrail) (specify):_____

(57) Fence
(58) Wall
(59) Building
(60) Ditch or culvert
(61) Ground
(62) Fire hydrant
(63) Curb
(64) Bridge
(68) Other fixed object (specify):

(69) Unknown fixed object

Collision with Nonfixed Object
(70) Passenger car, light truck, van, or other vehicle not in-transport
(71) Medium/heavy truck or bus not in-transport
(76) Animal
(77) Train
(78) Trailer, disconnected in transport
(79) Object fell from vehicle in-transport
(88) Other nonfixed object (specify):

(89) Unknown nonfixed object

(98) Other event (specify):

(99) Unknown event or object

OVERRIDE/UNDERRIDE (THIS VEHICLE)

51. Front Override/Underride (this Vehicle) 0

52. Rear Override/Underride (this Vehicle) 0

(0) No override/underride, or not an end-to-end impact between two CDS applicable vehicles, and no medium/heavy truck or bus underride

Override (see specific CDC)
[Between 2 CDS applicable vehicles (Bodytype, GV07 = 1-49)]
(1) 1st CDC
(2) 2nd CDC
(3) Other not automated CDC (specify):

Underride (see specific CDC)
[Between 2 CDS applicable vehicles (Bodytype, GV07 = 1-49)]
(4) 1st CDC
(5) 2nd CDC
(6) Other not automated CDC (specify):

(7) Medium/heavy truck or bus override (of any configuration)
(9) Unknown

HEADING ANGLE AT IMPACT FOR HIGHEST DELTA V

Values: (000)-(359) Code actual value
(997) Noncollision
(998) Impact with object
(999) Unknown

53. Heading Angle For This Vehicle 137

54. Heading Angle For Other Vehicle 242

RECONSTRUCTION DATA

55. Towed Trailing Unit 0
(0) No towed unit
(1) Yes—towed trailing unit
(9) Unknown

56. Documentation of Trajectory Data for This Vehicle 1
(0) No
(1) Yes

57. Post Collision Condition of Tree or Pole (For Highest Delta V) 0
(0) Not collision (for highest delta V) with tree or pole
(1) Not damaged
(2) Cracked/sheared
(3) Tilted <45 degrees
(4) Tilted ≥45 degrees
(5) Uprooted tree
(6) Separated pole from base
(7) Pole replaced
(8) Other (specify):

(9) Unknown

ACCIDENT RECONSTRUCTION PROGRAMS HIGHEST DELTA V

58. Basis for Total (Resultant) Delta V (highest) 07

(00) No vehicle inspection

Delta V Calculated
(01) Reconstruction program -damage only routine
(02) Reconstruction program -damage and trajectory routine
(03) Missing vehicle algorithm

Delta V Not Calculated
(04) At least one vehicle (which may be this vehicle) is beyond the scope of an acceptable reconstruction program, regardless of collision conditions.

All vehicles within scope (CDC applicable) of reconstuction program but one of the collision conditions is beyond the scope of the reconstruction program or other acceptable reconstruction technique, regardless of adequacy of damage data.

(05) Rollover
(06) Other non-horizontal forces
(07) Sideswipe type damage
(08) Severe override
(09) Yielding object
(10) Overlapping damage
(11) All vehicle and collision conditions are within scope of one of the acceptable reconstruction programs, but there is insufficient data available, (specify):

(98) Other, (specify): _____

COMPUTER GENERATED CRASH SEVERITY

59. Total Delta V 999

_____ Nearest kmph (highest)

_____ Nearest kmph (secondary)

(NOTE: 000 means less than 0.5 kmph)
(160)159.5 kmph and above
(999)Unknown

60. Longitudinal Component of Delta V (Highest) ± 999

_____ Nearest kmph (highest)

_____ Nearest kmph (secondary)

(NOTE: __000 means greater than −0.5 kmph and less than +0.5 kmph)
(±160) ±159.5 kmph and above
(__999) Unknown

61. Lateral Component of Delta V (Highest) ± 999

_____ Nearest kmph (highest)

_____ Nearest kmph (secondary)

(NOTE: __000 means greater than −0.5 kmph and less than +0.5 kmph)
(±160) ±159.5 kmph and above
(_999) Unknown

62. Energy Absorption 999,900

_____ Nearest 100 joules (highest)

_____ Nearest 100 joules (secondary)

(NOTE: 0000 means less than 50 joules)
(9997) 999,650 joules or more
(9999) Unknown

63. Impact Speed (Highest) 999

_____ Nearest kmph (highest)

_____ Nearest kmph (secondary)

(NOTE: 000 means less than 0.5 kmph)
(160) 159.5 kmph and above
(998) Trajectory algorithm not run
(999) Unknown

DELTA V CONFIDENCE LEVEL

64. Confidence In Reconstruction Program Results (For Highest Delta V) 0
(0) No reconstruction
(1) Collision fits model — results appear reasonable
(2) Collision fits model — results appear high
(3) Collision fits model — results appear low
(4) Borderline reconstruction — results appear reasonable

OTHER SPEED ESTIMATE

65. Barrier Equivalent Speed (Highest) 999

_____ Nearest kmph (highest)

_____ Nearest kmph (secondary)

(NOTE: 000 means less than 0.5 kmph)
(160) 159.5 kmph and above
(999) Unknown

IS MISSING VEHICLE ALGORITHM APPLICABLE FOR THIS VEHICLE? [] YES [] NO

IF YES: IS A COMPLETED PROGRAM SUMMARY INCLUDED? [] YES [] NO

ESTIMATED DELTA V

66. Estimated Highest Delta V (Researcher Determined) 2
 (0) Reconstruction Delta V coded

 Estimated Delta V
 (1) Less than 10 kmph
 (2) ≥ 10 kmph but < 25 kmph
 (3) ≥ 25 kmph but < 40 kmph
 (4) ≥ 40 kmph but < 55 kmph
 (5) ≥ 55 kmph

 Other estimates of damage severity
 (6) Minor
 (7) Moderate
 (8) Severe

 (9) Unknown

VEHICLE INSPECTION

67. Type of Vehicle Inspection 3
 (0) No inspection
 (1) Vehicle fully repaired-no damage evident
 (2) Partial inspection (specify):

 (3) Complete inspection

***** IF THE CDS APPLICABLE VEHICLE WAS NOT INSPECTED (I.E., GV67=0), *****

DO NOT COMPLETE THE EXTERIOR AND INTERIOR VEHICLE FORMS

***** IF GV07 DOES NOT EQUAL 01-49, DO NOT COMPLETE *****

THE EXTERIOR VEHICLE, INTERIOR VEHICLE,

OCCUPANT ASSESSMENT, AND OCCUPANT INJURY FORMS.

U.S. Department of Transportation

National Highway Traffic Safety Administration

EXTERIOR VEHICLE FORM

NATIONAL ACCIDENT SAMPLING SYSTEM
CRASHWORTHINESS DATA SYSTEM

1. ~~Primary Sampling Unit Number~~ ____
2. Case Number - Stratum 95-22
3. Vehicle Number 01

VEHICLE IDENTIFICATION

VIN 1G8ZG5288SZ _____ Model Year 95

Vehicle Make (specify): SATURN Vehicle Model (specify): SL1 4DR.

LOCATOR

Locate the end of the damage with respect to the vehicle longitudinal center line or bumper corner for end impacts or an undamaged axle for side impacts.

Specific Impact No.	Location of Direct Damage	Location of Field L	Location of Max Crush
1	LEFT FRONT SIDE AREA	FRONTAL	LF CORNER

CRUSH PROFILE IN CENTIMETERS

NOTES: Identify the plane at which the C-measurements are taken (e.g., at bumper, above bumper, at sill, above sill, etc.) and label adjustments (e.g., free space).

Measure C1 to C6 from driver to passenger side in front or rear impacts and rear to front in side impacts.

Free space value is defined as the distance between the baseline and the original body contour taken at the individual C locations. This may include the following: bumper lead, bumper taper, side protrusion, side taper, etc. Record the value for each C-measurement and maximum crush.

Use as many lines/columns as necessary to describe each damage profile.

Specific Impact Number	Plane of Impact C-Measurements	Direct Damage		Field L	C_1	C_2	C_3	C_4	C_5	C_6	±D
		Width (CDC)	Max Crush								
1	BUMPER										
	RE-BAR	105.4cm	15.5cm	105.4	15.5	7.6	4.4	1.9	1.3	0	@20.3

HS Form 435A (Rev. 1/95)

ORIGINAL SPECIFICATIONS WORK SHEET

Wheelbase	102.4	inches	x	2.54	=	260 cm
Overall Length	176.3	inches	x	2.54	=	448 cm
Maximum Width	67.6	inches	x	2.54	=	172 cm
Curb Weight	2,314	pounds	x	.4536	=	1,050 kg
Average Track	56.4	inches	x	2.54	=	143 cm
Front Overhang	___.	inches	x	2.54	=	99 cm
Rear Overhang	___.	inches	x	2.54	=	89 cm
Undeformed End Width	50.	inches	x	2.54	=	127 cm
Engine Size: cyl./displ.	1900	cc	x	.001	=	1.9 L
	___	CID	x	.0164	=	___. L

VEHICLE DAMAGE SKETCH

TIRE—WHEEL DAMAGE

a. Rotation physically restricted

RF 2
LF 2
RR 2
LR 2

b. Tire deflated

RF 2
LF 2
RR 2
LR 2

(1) Yes (2) No (8) NA (9) Unk.

TYPE OF TRANSMISSION

☒ Manual ☐ Automatic

END SHIFT ≥ 10 CM

☒ Yes ☐ No

ORIGINAL SPECIFICATIONS

Wheelbase	260	cm
Overall Length	448	cm
Maximum Width	172	cm
Curb Weight	1050	kg
Average Track	143	cm
Front Overhang	99	cm
Rear Overhang	89	cm
Undeformed End Width	127	cm
Engine Size: cyl./displ.	1.9	L

WHEEL STEER ANGLES
(For locked front wheels or displaced rear axles only)

RF ± ___ ___ o
LF ± ___ ___ o
RR ± ___ ___ o
LR ± ___ ___ o

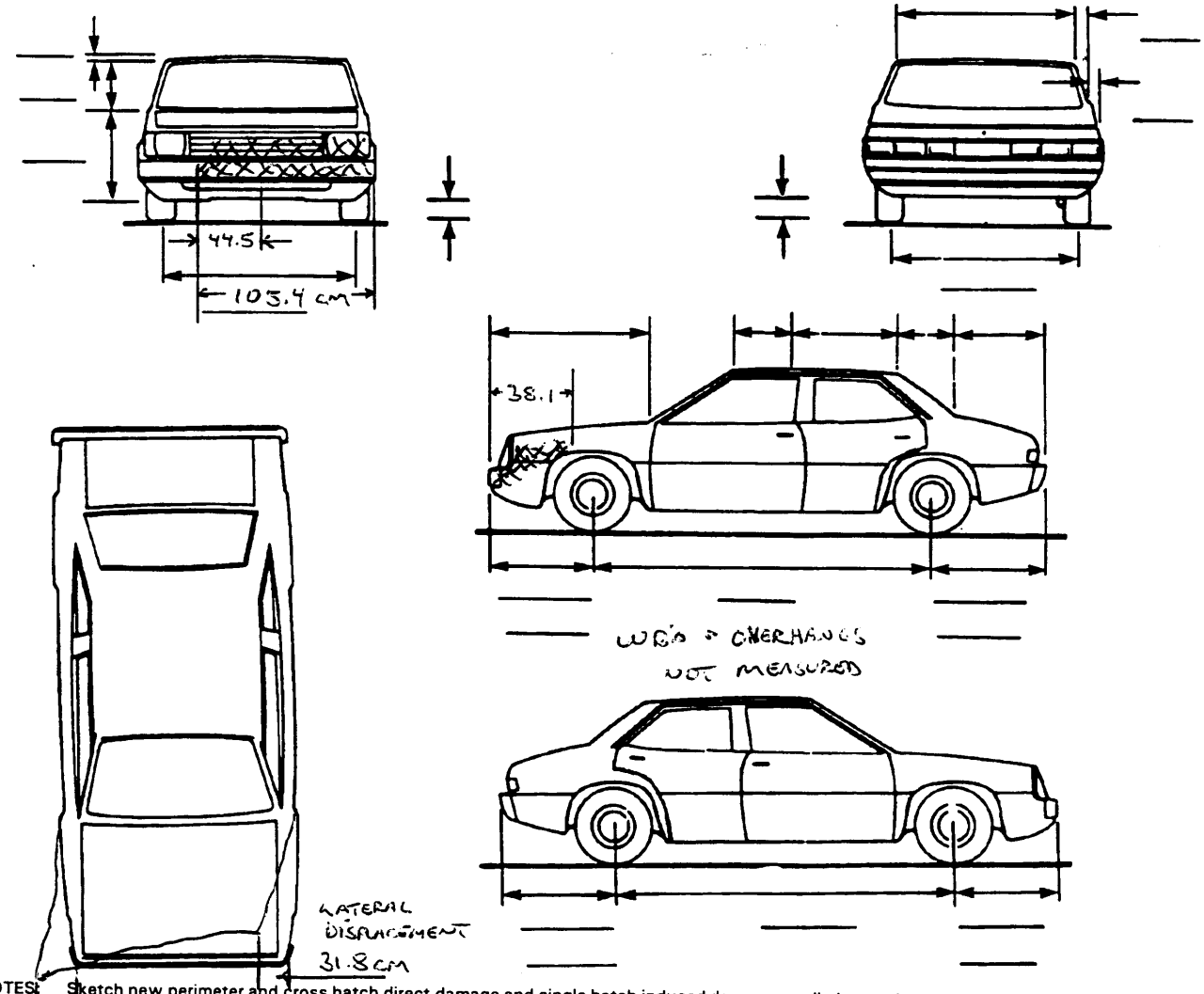
Within ± 5 degrees

DRIVE WHEELS

☒ FWD ☐ RWD ☐ 4WD

Approximate Cargo Weight 9 kg
CHILD RESTRAINTS

MEASUREMENTS IN CENTIMETERS



NOTES: Sketch new perimeter and cross hatch direct damage and single hatch induced damage on all views. Annotate observations which might be useful in reconstructing the accident (e.g., grass in tire bead, direction of striations, scuff on sidewalls, etc.). If pulling trailer, sketch type of trailer and damage received on the back of this page.

Annotate any damage caused by extrication such as component removal by torching, prying, or hydraulic shears.

CDC WORKSHEET

CODES FOR OBJECT CONTACTED

(01-30) — Vehicle Number

Noncollision
- (31) Overturn — rollover (excludes end-over-end)
- (32) Rollover—end-over-end
- (33) Fire or explosion
- (34) Jackknife
- (35) Other intraunit damage (specify):

- (36) Noncollision injury
- (38) Other noncollision (specify):

- (39) Noncollision — details unknown

Collision With Fixed Object
- (41) Tree (≤ 10 cm in diameter)
- (42) Tree (> 10 cm in diameter)
- (43) Shrubbery or bush
- (44) Embankment

- (45) Breakaway pole or post (any diameter)

Nonbreakaway Pole or Post
- (50) Pole or post (≤ 10 cm in diameter)
- (51) Pole or post (> 10 cm but ≤ 30 cm in diameter)
- (52) Pole or post (> 30 cm in diameter)
- (53) Pole or post (diameter unknown)

- (54) Concrete traffic barrier
- (55) Impact attenuator
- (56) Other traffic barrier (includes guardrail) (specify):_____
- (57) Fence
- (58) Wall
- (59) Building
- (60) Ditch or culvert
- (61) Ground
- (62) Fire hydrant
- (63) Curb
- (64) Bridge
- (68) Other fixed object (specify):

- (69) Unknown fixed object

Collision with Nonfixed Object
- (70) Passenger car, light truck, van, or other vehicle not in-transport
- (71) Medium/heavy truck or bus not in-transport
- (72) Pedestrian
- (73) Cyclist or cycle
- (74) Other nonmotorist or conveyance

- (75) Vehicle occupant
- (76) Animal
- (77) Train
- (78) Trailer, disconnected in transport
- (79) Object fell from vehicle in-transport
- (88) Other nonfixed object (specify):

- (89) Unknown nonfixed object

- (98) Other event (specify):

- (99) Unknown event or object

DEFORMATION CLASSIFICATION BY EVENT NUMBER

Accident Event Sequence Number	Object Contacted	(1) (2) Direction of Force (degrees)	Incremental Value of Shift	(3) Deformation Location	(4) Specific Longitudinal or Lateral Location	(5) Specific Vertical or Lateral Location	(6) Type of Damage Distribution	(7) Deformation Extent
01	02	270	-	L	F	E	E	04

COLLISION DEFORMATION CLASSIFICATION

HIGHEST DELTA "V"

Accident Event Sequence Number	Object Contacted	(1) (2) Direction of Force	(3) Deformation Location	(4) Longitudinal or Lateral Location	(5) Vertical or Lateral Location	(6) Type of Damage Distribution	(7) Deformation Extent
4. 01	5. 02	6. 09	7. L	8. F	9. E	10. E	11. 04

Second Highest Delta "V"

12.	13.	14.	15.	16.	17.	18.	19.

CRUSH PROFILE IN CENTIMETERS

The crush profile for the damage described in the CDC(s) above should be documented in the appropriate space below. (ALL MEASUREMENTS ARE IN CENTIMETERS.)

HIGHEST DELTA "V"

20. L	21. C_1	C_2	C_3	C_4	C_5	C_6	22. ±D
105	016	008	004	002	001	000	+ 0020

Second Highest Delta "V"

23. L	24. C_1	C_2	C_3	C_4	C_5	C_6	25. ±D
							+ −

26. Undeformed End Width (Coded when highest severity impact is an end plane impact.) 127
- ____ Code to the nearest centimeter
- (250) 250 centimeters or more
- (998) No highest severity end plane impact
- (999) Unknown

27. Direct Damage Width (For highest severity impact) 105
- ____ Code to the nearest centimeter
- (250) 250 centimeters or more
- (999) Unknown

28. Original Wheelbase 260
- ____ Code to the nearest centimeter
- (650) 650 centimeters or more
- (999) Unknown

102.4 inches X 2.54 = 260 centimeters

29. Original Average Track Width 143
- ____ Code to the nearest centimter
- (185) 185 centimeters or more
- (999) Unknown

56.7 inches X 2.54 = 143 centimeters

30. Are CDCs Documented but Not Coded on The Automated File? 0
(0) No
(1) Yes

31. Researcher's Assessment of Vehicle Disposition 1
(0) Not towed due to vehicle damage
(1) Towed due to vehicle damage
(9) Unknown

32. Is This A Multi-Stage Manufactured Vehicle And/Or A Certified Altered Vehicle? 0
(0) No post manufacturer modifications
(1) Yes - post manufacturer modifications (specify): _____

(Include photograph of CERTIFICATION PLACARD in case report)
(9) Unknown if vehicle is modified

FIRE OCCURRENCE

33. Fire Occurrence 0
(0) No fire

Yes, fire occurred
(1) Minor
(2) Major
(9) Unknown

34. Origin of Fire 0
(0) No fire
(1) Vehicle exterior (front, side, back, top)
(2) Exhaust system
(3) Fuel tank (and other fuel retention system parts)
(4) Engine compartment
(5) Cargo/trunk compartment
(6) Instrument panel
(7) Passenger compartment area
(8) Other location (specify):

(9) Unknown

FUEL SYSTEM

35. Location of Fuel Tank-1 Filler Cap 2

36. Location of Fuel Tank-2 Filler Cap 0
(0) No fuel tank
(1) On back plane
(2) Aft of center of the rear wheels (rear axle) on left side plane
(3) Aft of center of the rear wheels (rear axle) on right side plane
(4) Forward of center of the rear wheels (rear axle) on left side plane
(5) Forward of center of the rear wheels (rear axle) on right side plane
(6) Over the center of the rear wheels (rear axle) on left side plane
(7) Over the center of the rear wheels (rear axle) on right side plane
(8) Other (specify): _____
(9) Unknown

37. Type of Fuel Tank-1 2

38. Type of Fuel Tank-2 0
(0) No fuel tank (electrical vehicle)
(1) Metallic
(2) Non-metallic
(9) Unknown

39. Location of Fuel Tank-1 1

40. Location of Fuel Tank-2 0
(0) No fuel tank
(1) Aft of center of the rear wheels (rear axle) centered
(2) Aft of center of the rear wheels (rear axle) left side
(3) Aft of center of the rear wheels (rear axle) right side
(4) Forward of center of the rear wheels (rear axle) centered
(5) Forward of center of the rear wheels (rear axle) left side
(6) Forward of center of the rear wheels (rear axle) right side
(7) Over center of the rear wheels (rear axle)
(8) Other (specify): _____
(9) Unknown

41. Damage to Fuel Tank-1 1

42. Damage to Fuel Tank-2 0
(0) No fuel tank
(1) No damage to fuel tank
(2) Deformed, no seam failure
(3) Deformed, with a seam failure
(4) Punctured
(5) Lacerated (ripped)
(6) Abraded (scraped)
(7) Filler neck separation from the fuel tank
(8) Other damage (specify): _____
(9) Unknown

43. Leakage Location of Fuel System-1 1

44. Leakage Location of Fuel System-2 0
(0) No fuel tank
(1) No fuel leakage

Primary Area Of Leakage
(2) Tank
(3) Filler neck
(4) Cap
(5) Lines/pump/filter
(6) Vent/emission recovery
(8) Other (specify):_____
(9) Unknown

45. Fuel Type-1 01

46. Fuel Type-2 00

Single Fuel Type
(00) No fuel tank
(01) Gasoline
(02) Diesel
(03) CNG (Compressed Natural Gas)
(04) LPG (Liquid Petroleum Gas) also known as Propane
(05) LNG (Liquid Natural Gas)
(06) Methanol (M100 or M85)
(07) Ethanol (E100 or E85)
(08) Other (Hydrogen or others) (specify):

Electric Powered or Electric/Solar Powered Vehicles
(10) Lead Acid Battery
(11) Nickel-Iron Battery
(12) Nickel-Cadmium Battery
(13) Sodium Metal Chloride Battery
(14) Sodium Sulfur Battery
(18) Other (Specify):_____

(98) Other Hybrid (specify):

(99) Unknown fuel type

47. Is This Vehicle Equipped With More Than Two Fuel Tanks? 0
(0) No (one or two tanks only)

Yes - More Than Two Tanks
(1) Yes -- no damage to any tank or filler cap and no fuel system leakage
(2) Yes -- no damage to any tank or filler cap but there is fuel system leakage (specify leakage location):

(3) Yes -- damage to an additional tank or filler cap and there is fuel system leakage (specify the following):
Type of tank _____
Tank location _____
Filler cap location _____
Tank damage _____
Location of leakage _____
Type of fuel _____
(9) Unknown if more than two tanks

COMMENTS

*** STOP: IF THE CDS APPLICABLE VEHICLE WAS NOT TOWED ***

(GV10=0)

DO NOT COMPLETE THE INTERIOR VEHICLE FORM.

U.S. Department of Transportation

National Highway Traffic Safety Administration

INTERIOR VEHICLE FORM

NATIONAL ACCIDENT SAMPLING SYSTEM
CRASHWORTHINESS DATA SYSTEM

1. ~~Primary Sampling Unit Number~~ ____
2. Case Number - ~~Stratum~~ 95-22
3. Vehicle Number 01

INTEGRITY

4. Passenger Compartment Integrity 00

(00) No integrity loss

Yes, Integrity Was Lost Through
(01) Windshield
(02) Door (side)
(03) Door/hatch (back door)
(04) Roof
(05) Roof glass
(06) Side window
(07) Rear window (backlight)
(08) Roof and roof glass
(09) Windshield and door (side)
(10) Windshield and roof
(11) Side and rear window (side window and backlight)
(12) Windshield and side window
(13) Door and side window
(98) Other combination of above (specify): _____
(99) Unknown

Door, Tailgate or Hatch Opening

5. LF 1 6. RF 1 7. LR 1 8. RR 1 9. TG/H 0

(0) No door/gate/hatch
(1) Door/gate/hatch remained closed and operational
(2) Door/gate/hatch came open during collision
(3) Door/gate/hatch jammed shut
(8) Other (specify): _____
(9) Unknown

Damage/Failure Associated with Door, Tailgate or Hatch Opening in Collision. If IV05-IV09 ≠ 2, Then code Ø

10. LF 0 11. RF 0 12. LR 0 13. RR 0 14. TG/H 0

(0) No door/gate/hatch or door not opened

Door, Tailgate or Hatch Came Open During Collision
(1) Door operational (no damage)
(2) Latch/striker failure due to damage
(3) Hinge failure due to damage
(4) Door structure failure due to damage
(5) Door support (i.e., pillar, sill, roof side rail, etc.) failure due to damage
(6) Latch/striker and hinge failure due to damage
(8) Other failure (specify): _____
(9) Unknown

GLAZING

Type of Window/Windshield Glazing

15. WS 1 16. LF 3 17. RF 3 18. LR 3 19. RR 3
20. BL 3 21. Roof 0 22. Other 0

(0) No glazing
(1) AS-1 — Laminated
(2) AS-2 — Tempered
(3) AS-3 — Tempered-tinted (original)
(4) AS-2 — Tempered-with after market tint
(5) AS-3 — Tempered-tinted (with additional after market tint)
(6) AS-14 — Glass/Plastic
(7) Glazing removed prior to accident
(8) Other (specify): _____
(9) Unknown

Window Precrash Glazing Status

23. WS 1 24. LF 2 25. RF 2 26. LR 2 27. RR 2
28. BL 1 29. Roof 0 30. Other 0

(0) No glazing
(1) Fixed
(2) Closed
(3) Partially opened
(4) Fully opened
(7) Glazing removed prior to accident
(9) Unknown

Glazing Damage from Impact Forces

31. WS 1 32. LF 1 33. RF 1 34. LR 1 35. RR 1
36. BL 1 37. Roof 0 38. Other 0

(0) No glazing
(1) No glazing damage from impact forces
(2) Glazing in place and cracked from impact forces
(3) Glazing in place and holed from impact forces
(4) Glazing out-of-place (cracked or not) and not holed from impact forces
(5) Glazing out-of-place and holed from impact forces
(6) Glazing disintegrated from impact forces
(7) Glazing removed prior to accident
(9) Unknown if damaged

Glazing Damage from Occupant Contact

39. WS 1 40. LF 1 41. RF 1 42. LR 1 43. RR 1
44. BL 1 45. Roof 0 46. Other 0

(0) No glazing
(1) No occupant contact to glazing
(2) Glazing contacted by occupant but no glazing damage
(3) Glazing in place and cracked by occupant contact
(4) Glazing in place and holed by occupant contact
(5) Glazing out-of-place (cracked or not) by occupant contact and not holed by occupant contact
(6) Glazing out-of-place by occupant contact and holed by occupant contact
(7) Glazing removed prior to accident
(8) Glazing disintegrated by occupant contact
(9) Unknown if contacted by occupant

OCCUPANT AREA INTRUSION

Note: If no intrusions, leave variables IV47-IV86 blank.

	Location of Intrusion	Intruding Component	Magnitude of Intrusion	Dominant Crush Direction
1st	47.___ ___	48.___ ___	49.___	50.___
2nd	51.___ ___	52.___ ___	53.___	54.___
3rd	55.___ ___	56.___ ___	57.___	58.___
4th	59.___ ___	60.___ ___	61.___	62.___
5th	63.___ ___	64.___ ___	65.___	66.___
6th	67.___ ___	68.___ ___	69.___	70.___
7th	71.___ ___	72.___ ___	73.___	74.___
8th	75.___ ___	76.___ ___	77.___	78.___
9th	79.___ ___	80.___ ___	81.___	82.___
10th	83.___ ___	84.___ ___	85.___	86.___

LOCATION OF INTRUSION

Front Seat
- (11) Left
- (12) Middle
- (13) Right

Second Seat
- (21) Left
- (22) Middle
- (23) Right

Third Seat
- (31) Left
- (32) Middle
- (33) Right

Fourth Seat
- (41) Left
- (42) Middle
- (43) Right

- (97) Catastrophic
- (98) Other enclosed area (specify) _____
- (99) Unknown

INTRUDING COMPONENT

Interior Components
- (01) Steering assembly
- (02) Instrument panel left
- (03) Instrument panel center
- (04) Instrument panel right
- (05) Toe pan
- (06) A (A1/A2)-pillar
- (07) B-pillar
- (08) C-pillar
- (09) D-pillar
- (10) Side panel - forward of the A1/A2-pillar
- (11) Door panel (side)
- (12) Side panel - rear of the B-pillar
- (13) Roof (or convertible top)
- (14) Roof side rail
- (15) Windshield NO INTRUSION
- (16) Windshield header
- (17) Window frame
- (18) Floor pan (includes sill)
- (19) Backlight header
- (20) Front seat back
- (21) Second seat back
- (22) Third seat back
- (23) Fourth seat back
- (24) Fifth seat back
- (25) Seat cushion
- (26) Back door/panel (e.g., tailgate)
- (27) Other interior component (specify): _____

Exterior Components
- (30) Hood
- (31) Outside surface of this vehicle (specify): _____
- (32) Other exterior object in the environment (specify): _____
- (33) Unknown exterior object
- (97) Catastrophic
- (98) Intrusion of unlisted component(s) (specify): _____
- (99) Unknown

MAGNITUDE OF INTRUSION
- (1) ≥ 3 centimeters but < 8 centimeters
- (2) ≥ 8 centimeters but < 15 centimeters
- (3) ≥ 15 centimeters but < 30 centimeters
- (4) ≥ 30 centimeters but < 46 centimeters
- (5) ≥ 46 centimeters but < 61 centimeters
- (6) ≥ 61 centimeters
- (7) Catastrophic
- (9) Unknown

DOMINANT CRUSH DIRECTION
- (1) Vertical
- (2) Longitudinal
- (3) Lateral
- (7) Catastrophic
- (9) Unknown

STEERING COLUMN

87. Steering Column Type — 2
(1) Fixed column
(2) Tilt column
(3) Telescoping column
(4) Tilt and telescoping column
(8) Other column type (specify): _____
(9) Unknown

88. Tilt Steering Column Adjustment — 1
(0) No tilt steering column
(1) Full up
(2) Between full up and center
(3) Center
(4) Between center and full down
(5) Full down
(9) Unknown

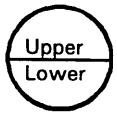
89. Telescoping Steering Column Adjustment — 0
(0) No telescoping steering column
(1) Full back
(2) Between full back and midpoint
(3) Midpoint
(4) Between midpoint and full forward
(5) Full forward
(9) Unknown

90. Steering Rim/Spoke Deformation — 0 0
_____Code actual measured deformation to the nearest centimeter
(00) No steering rim deformation
(01-14) Actual measured value in centimeters
(15) 15 centimeters or more
(98) Observed deformation cannot be measured
(99) Unknown

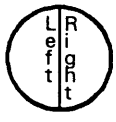
91. Location of Steering Rim/Spoke Deformation — 0 0
(00) No steering rim deformation

Quarter Sections
(01) Section A
(02) Section B
(03) Section C
(04) Section D





Half Sections
(05) Upper half of rim/spoke
(06) Lower half of rim/spoke
(07) Left half of rim/spoke
(08) Right half of rim/spoke



(09) Complete steering wheel collapse
(10) Undetermined location
(99) Unknown

INSTRUMENT PANEL

92. Odometer Reading — 0 1 6 ,000
_____ kilometers
Code to the nearest 1,000 kilometers
(000) No odometer
(001) Less than 1,500 kilometers
(500) 499,500 kilometers or more
(999) Unknown
10,236 miles X 1.6093 = 16,473 kilometers

Source: VEHICLE INSPECTION

93. Instrument Panel Damage from Occupant Contact? — 0
(0) No
(1) Yes
(9) Unknown

94. Type of Knee Bolster Covering — 1
(0) No knee bolster
(1) Padded
(2) Rigid plastic
(8) Other (specify): _____
(9) Unknown

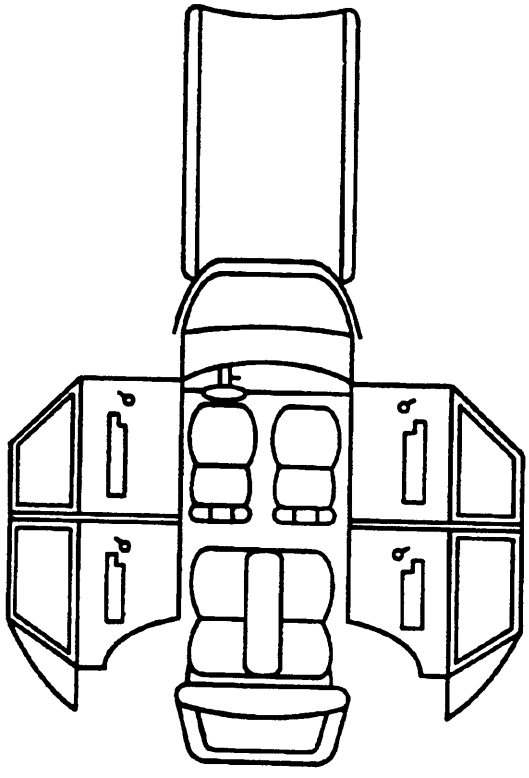
95. Knee Bolsters Deformed from Occupant Contact? — 1
(0) No knee bolster
(1) No deformation
(2) Yes - deformation
(9) Unknown

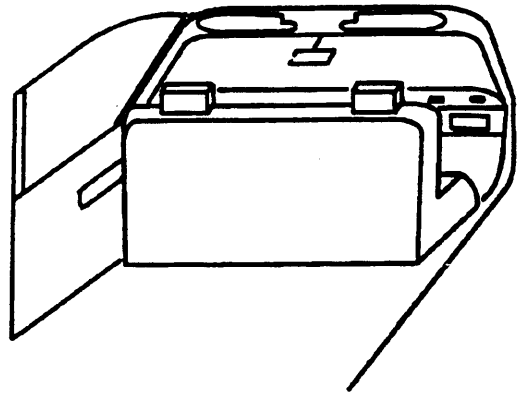
96. Did Glove Compartment Door Open During Collision(s)? — 1
(0) No glove compartment door
(1) No - door did not open
(2) Yes - door opened
(9) Unknown

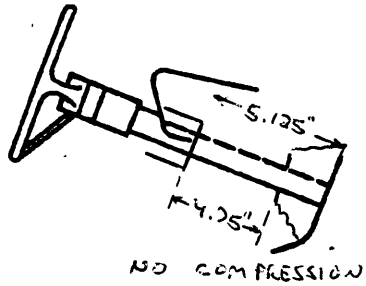
97. Adaptive (Assistive) Driving Equipment — 0
(0) No adaptive driving equipment
(1) Adaptive driving equipment installed (Check all that apply.)
[] Hand controls for braking/acceleration
[] Steering control devices (attached to OEM steering wheel
[] Steering knob attached to steering wheel
[] Low effort power steering (unit or device)
[] Replacement steering wheel (i.e., reduced diameter)
[] Joy-stick steering controls
[] Wheelchair tie-downs
[] Modification to seat belts (specify): _____
[] Additional or relocated switches (specify): _____
[] Raised roof
[] Wall-mounted head rest (used behind wheelchair)
[] Other adaptive device (specify): _____
(9) Unknown

VEHICLE INTERIOR SKETCHES

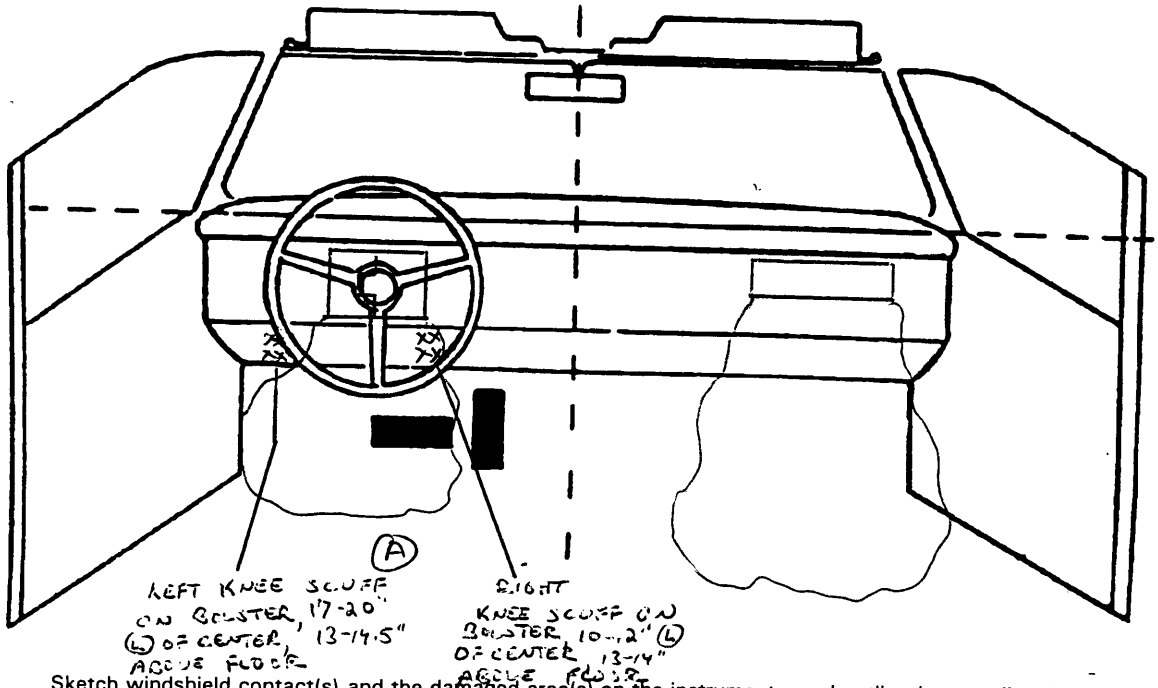
Note area of ejection/entrapment







NO COMPRESSION OF COLUMN



Sketch windshield contact(s) and the damaged area(s) on the instrument panel outline (e.g., radio, glove compartment, damage to instrument panel structure.
Cross hatch contact points, draw spider webs or use other annotation as may be appropriate.
Annotate the contacted area with a letter (begin with A) and list on the Points of Occupant Contact page.

POINTS OF OCCUPANT CONTACT

Contact	Interior Component Contacted	Occupant No. If Known	Body Region If Known	Supporting Physical Evidence	Confidence Level of Contact Point
A	014	1	KNEES	SCUFFS/ABRASIONS	1
B	170	1	FACE/TORSO	POSITION/TRAJECTORY, NO DIRECT	1
C	152	1	TORSO	NONE	1
D					
E					
F					
G					
H					
I					
J					
K					
L					
M					
N					

CODES FOR INTERIOR COMPONENTS

FRONT
(001) Windshield
(002) Mirror
(003) Sunvisor
(004) Steering wheel rim
(005) Steering wheel hub/spoke
(006) Steering wheel (combination of codes 004 and 005)
(007) Steering column,transmission selector lever, other attachment
(008) Cellular telephone or CB radio
(009) Add on equipment(e.g., tape deck, air conditioner)
(010) Left instrument panel and below
(011) Center instrument panel and below
(012) Right instrument panel and below
(013) Glove compartment door
(014) Knee bolster
(015) Windshield including one or more of the following: front header, A (A1/A2)-pillar, instrument panel, mirror, or steering assembly (driver side only)
(016) Windshield including one or more of the following: front header, A (A1/A2)-pillar, instrument panel, or mirror (passenger side only)
(017) Windshield reinforced by exterior object, (specify): _____
(019) Other front object (specify): _____

LEFT SIDE
(051) Left side interior surface, excluding hardware or armrests
(052) Left side hardware or armrest
(053) Left A (A1/A2)-pillar
(054) Left B-pillar
(055) Other left pillar (specify): _____
(056) Left side window glass
(057) Left side window frame
(058) Left side window sill
(059) Left side window glass including one or more of the following: frame, window sill, A (A1/A2)-pillar, B-pillar, or roof side rail.
(060) Other left side object (specify): _____

RIGHT SIDE
(101) Right side interior surface, excluding hardware or armrests
(102) Right side hardware or armrest
(103) Right A (A1/A2)-pillar
(104) Right B-pillar
(105) Other right pillar (specify): _____
(106) Right side window glass
(107) Right side window frame
(108) Right side window sill
(109) Right side window glass including one or more of the following: frame, window sill, A (A1/A2)-pillar, B-pillar, or roof side rail.
(110) Other right side object (specify): _____

INTERIOR
(151) Seat, back support
(152) Belt restraint webbing/buckle
(153) Belt restraint B-pillar or door frame attachment point
(154) Other restraint system component (specify): _____
(155) Head restraint system
(160) Other occupants (specify): _____
(161) Interior loose objects
(162) Child safety seat (specify): _____
(163) Other interior object (specify): _____

AIR BAG
(170) Air bag-driver side
(175) Air bag compartment cover-driver side
(180) Air bag-passenger side
(185) Air bag compartment cover-passenger side
(190) Other air bag (specify) _____
(195) Other air bag compartment cover (specify) _____

ROOF
(201) Front header
(202) Rear header
(203) Roof left side rail
(204) Roof right side rail
(205) Roof or convertible top

FLOOR
(251) Floor (including toe pan)
(252) Floor or console mounted transmission lever, including console
(253) Parking brake handle
(254) Foot controls including parking brake

REAR
(301) Backlight (rear window)
(302) Backlight storage rack, door, etc.
(303) Other rear object (specify): _____

ADAPTIVE (ASSISTIVE) DRIVING EQUIPMENT
(401) Hand controls for braking/acceleration
(402) Steering control devices (attached to OEM steering wheel)
(403) Steering knob attached to steering wheel
(405) Replacement steering wheel (i.e., reduced diameter)
(406) Joy stick steering controls
(407) Wheelchair tie-downs
(408) Modification to seat belts, (specify): _____
(409) Additional or relocated switches, (specify): _____
(410) Raised roof
(411) Wall mounted head rest (used behind wheel chair)
(412) Other adaptive device (specify): _____

CONFIDENCE LEVEL OF CONTACT POINT
(1) Certain
(2) Probable
(3) Possible
(9) Unknown

MANUAL RESTRAINTS

NOTES: Encode the applicable data **for each seat position** in the vehicle. The attribute for the variable may be found below. Restraint systems should be assessed during the vehicle inspection then coded on the Occupant Assessment Form.

If a Child safety seat is present, encode the data on the back of this page.

If the vehicle has automatic restraints available, encode the appropriate data on the back of the previous page.

		Left	Center	Right
FIRST	Availability	4	–	4
	Evidence of usage	4	–	13
	Used in this crash?	4	–	13
	Proper Use	1	–	2
	Failure Modes	1	–	1
	Anchorage Adjustment	1	–	1
SECOND	Availability	4	3	4
	Evidence of usage	14	–	14
	Used in this crash?	14	–	14
	Proper Use	1	–	1
	Failure Modes	1	–	1
	Anchorage Adjustment	1	–	1
OTHER	Availability			
	Evidence of usage			
	Used in this crash?			
	Proper Use			
	Failure Modes			
	Anchorage Adjustment			

Manual (Active) Belt System Availability

(0) None available
(1) Belt removed/destroyed
(2) Shoulder belt
(3) Lap belt
(4) Lap and shoulder belt
(5) Belt available - type unknown

Integral Belt Partially Destroyed

(6) Shoulder belt (lap belt destroyed/removed)
(7) Lap belt (shoulder belt destroyed/removed)
(8) Other belt (specify): _____
(9) Unknown

Manual (Active) Belt System Use

(00) None used, not available, or belt removed/destroyed
(01) Inoperable (specify): _____
(02) Shoulder belt
(03) Lap belt
(04) Lap and shoulder belt
(05) Belt used - type unknown
(08) Other belt used (specify): _____
(12) Shoulder belt used with child safety seat
(13) Lap belt used with child safety seat
(14) Lap and shoulder belt used with child safety seat
(15) Belt used with child safety seat - type unknown
(18) Other belt used with child safety seat (specify): _____
(99) Unknown if belt used

Proper Use of Manual (Active) Belts

(0) None used or not available
(1) Belt used properly
(2) Belt used properly with child safety seat

Belt Used Improperly

(3) Shoulder belt worn under arm
(4) Shoulder belt worn behind back or seat
(5) Belt worn around more than one person
(6) Lap belt worn on abdomen
(7) Lap belt or lap and shoulder belt used improperly with child safety seat (specify): _____
(8) Other improper use of manual belt system (specify): _____
(9) Unknown

Manual (Active) Belt Failure Modes During Accident

(0) No manual belt used or not available
(1) No manual belt failure(s)
(2) Torn webbing (stretched webbing not included)
(3) Broken buckle or latchplate
(4) Upper anchorage separated
(5) Other anchorage separated (specify): _____
(6) Broken retractor
(7) Combination of above (specify): _____
(8) Other manual belt failure (specify): _____
(9) Unknown

Shoulder Belt Upper Anchorage Adjustment

(0) No shoulder belt
(1) No upper anchorage adjustment for shoulder belt

Adjustable shoulder Belt Upper Anchorage

(2) In full up position
(3) In mid position
(4) In full down position
(5) Position unknown
(9) Unknown if position has adjustable upper anchorage adjustment

AUTOMATIC RESTRAINTS

NOTES: Encode the data for each applicable front seat position. The attribute for the variables may be found below. Restraint systems should be assessed during the vehicle inspection then coded on the Occupant Assessment Form.

AIR BAGS

		Left Front	Right Front	Other
FIRST	Availability/Function	1	1	
	Deployment	1	1	
	Failure	1	1	

Air Bag System Availability/Function
(0) Not equipped/not available
(1) Air bag

Non-functional
(2) Air bag disconnected (specify): _____
(3) Air bag not reinstalled
(9) Unknown

Are There Indications of Air Bag System Failure? (This Occupant Position)
(0) Not equipped/not available
(1) No
(2) Yes (specify): _____
(9) Unknown

Frontal Air Bag System Deployment (This Occupant Position)
(0) Not equipped/not available
(1) Deployed during accident (as a result of impact)
(2) Deployed inadvertently just prior to accident
(3) Deployed, accident sequence undetermined
(4) Deployed as a result of a noncollision event during accident sequence (e.g., fire, explosion, electrical)
(5) Unknown if deployed
(7) Nondeployed
(9) Unknown

Air Bag(s) Deployment, *Other* Than First Seat Frontal (This Occupant Position)
(0) Not equipped with an *"other"* air bag
(1) Deployed during accident (as a result of impact)
(2) Deployed inadvertently just prior to accident
(3) Deployed, details unknown
(4) Deployed as a result of a noncollision event during accident sequence (e.g., fire, explosion, electrical)
(5) Unknown if deployed
(7) Nondeployed
(9) Unknown

AUTOMATIC BELTS

		Left	Right
FIRST	Availability/Function	0	6
	Use	0	0
	Type	0	0
	Proper Use	0	0
	Failure Modes	0	6

Automatic (Passive) Belt System Availability/Function
(0) Not equipped/not available
(1) 2 point automatic belts
(2) 3 point automatic belts
(3) Automatic belts - type unknown

Non-functional
(4) Automatic belts destroyed or rendered inoperative
(9) Unknown

Automatic (Passive) Belt System Use
(0) Not equipped/not available/destroyed or rendered inoperative
(1) Automatic belt in use
(2) Automatic belt not in use (manually disconnected, motorized track inoperative)
(3) Automatic belt use unknown
(9) Unknown

Automatic (Passive) Belt System Type
(0) Not equipped/not available
(1) Non-motorized system
(2) Motorized system
(9) Unknown

Proper Use of Automatic (Passive) Belt System
(0) Not equipped/not available/not used
(1) Automatic belt used properly
(2) Automatic belt used properly with child safety seat

Automatic Belt Used Improperly
(3) Automatic shoulder belt worn under arm
(4) Automatic shoulder belt worn behind back
(5) Automatic belt worn around more than one person
(6) Lap portion of automatic belt worn on abdomen
(7) Automatic lap and shoulder belt or automatic shoulder belt used improperly with child safety seat (specify): _____
(8) Other improper use of automatic belt system (specify): _____
(9) Unknown

Automatic (Passive) Belt Failure Modes During Accident
(0) Not equipped/not available/not in use
(1) No automatic belt failure(s)
(2) Torn webbing (stretched webbing not included)
(3) Broken buckle or latchplate
(4) Upper anchorage separated
(5) Other anchorage separated (specify): _____
(6) Broken retractor
(7) Combination of above (specify):
(8) Other automatic belt failure (specify): _____
(9) Unknown

FIRST SEAT FRONTAL AIR BAGS

NOTES: Encode the applicable data ***for the driver and first seat passenger*** in the vehicle. The attribute for the variable may be found below. Restraint systems should be assessed during the vehicle inspection then coded on the Occupant Assessment Form.

	Driver	Passenger
Type of air bag?	1	1
Flaps open at tear points?	2	2
Flaps damaged?	1	1
Air bag damaged?	01	07
Source of air bag damage	01	88 (CHILD RESTRAINT)
Air bag tethered?	2 (4)	2 (2)
Air bag have vent ports?	2 (2)	1 (0)
Other occupant contact air bag?	1	1
Occupant wearing eyewear?	2	1

Type of Air Bag
(0) Not equipped/not available
(1) Original manufacturer installed system
(2) Retrofitted air bag
(3) Replacement air bag
(8) Unknown type of air bag
(9) Unknown

Did Air Bag Module Cover Flap(s) Open At Designated Tear Points?
(0) Not equipped/not available
(1) No
(2) Yes
(3) Deployed, unknown if flap(s) opened at designated tear points
(7) Not deployed
(8) Unknown if deployed
(9) Unknown

Were Air Bag Module Cover Flap(s) Damaged?
(0) Not equipped/not available
(1) No
(2) Yes (specify): _____
(3) Deployed, unknown if air bag module cover flap(s) damaged
(7) Not deployed
(8) Unknown if deployed
(9) Unknown

Was There Damage To The Air Bag?
(00) Not equipped/not available
(01) Not damaged

Yes - Air Bag Damage
(02) Ruptured
(03) Cut
(04) Torn
(05) Holed
(06) Burned
(07) Abraded
(88) Other damage (specify): _____
(95) Damaged, details unknown
(96) Deployed, unknown if damaged
(97) Not deployed
(98) Unknown if deployed
(99) Unknown

Source of Air Bag Damage
(00) Not equipped/not available
(01) Not damaged
(02) Object worn by occupant, (specify): _____
(03) Object carried by occupant, (specify): _____
(04) Adaptive/assistive controls, (specify): _____
(05) Fire in vehicle
(06) Thermal burns
(07) Rescue or emergency efforts
(88) Other damage source (specify): _____
(95) Damaged, unknown source
(96) Deployed, unknown if damaged
(97) Not deployed
(98) Unknown if deployed
(99) Unknown

Was The Air Bag Tethered?
(0) Not equipped/not available
(1) No
(2) Yes (specify number of tether straps): _____
(3) Deployed, unknown if tethered
(7) Not deployed
(8) Unknown if deployed
(9) Unknown

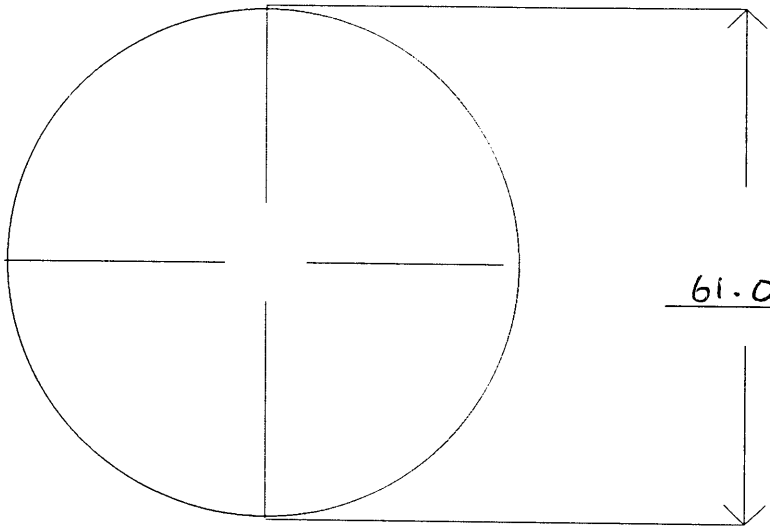
Did The Air Bag Have Vent Ports?
(0) Not equipped/not available
(1) No
(2) Yes (specify number of vent ports): _____
(3) Deployed, unknown if vent ports present
(7) Not deployed
(8) Unknown if deployed
(9) Unknown

Was the Air Bag in this Occupant's Position Contacted by Another Occupant?
(0) Not equipped/not available
(1) No
(2) Yes (specify): _____
(3) Deployed, unknown if other occupant contact to air bag
(7) Not deployed
(8) Unknown if deployed
(9) Unknown

Was This Occupant Wearing Eye-wear?
(0) Not equipped/not available
(1) No
(2) Eyeglasses/sunglasses
(3) Contact lenses
(4) Deployed, unknown if eyewear worn
(7) Not deployed
(8) Unknown if deployed
(9) Unknown

DRIVER AIR BAG DAMAGE AND CONTACT SKETCHES

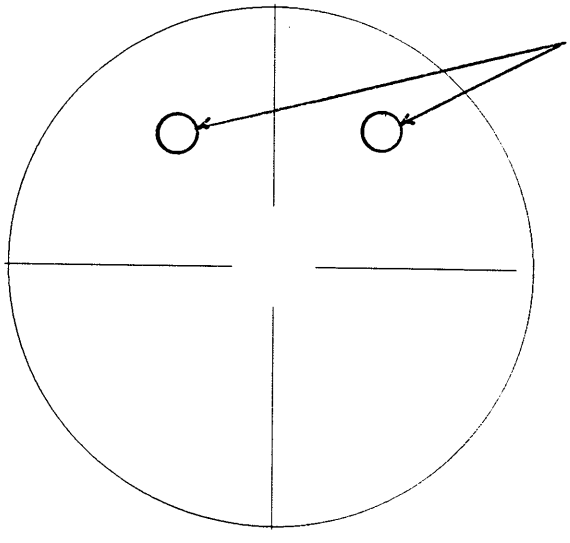
1. SKETCH DAMAGE AND CONTACT EVIDENCE ON DRIVER AIR BAG (Front)



(24.0")
61.0 cm.

NO DAMAGE

2. SKETCH DAMAGE AND CONTACT EVIDENCE ON DRIVER AIR BAG (Back)



DRIVER AIR BAG SKETCHES (Cont'd)

3. DRIVER AIR BAG MODULE COVER FLAP SIZE (DOUBLE)

a. Upper Flap

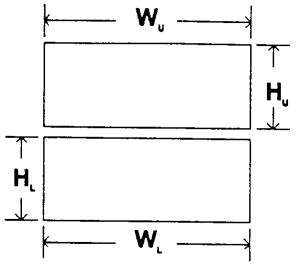
width (W_U) 10.2 cm

height (H_U) 13.3 cm

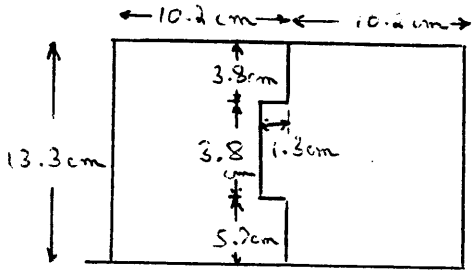
b. Lower Flap

width (W_L) 10.2cm

height (H_L) 13.3 cm

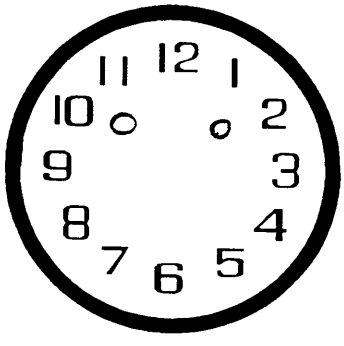


4. SKETCH OF OTHER TYPE OF AIR BAG MODULE FLAP AND SIZE



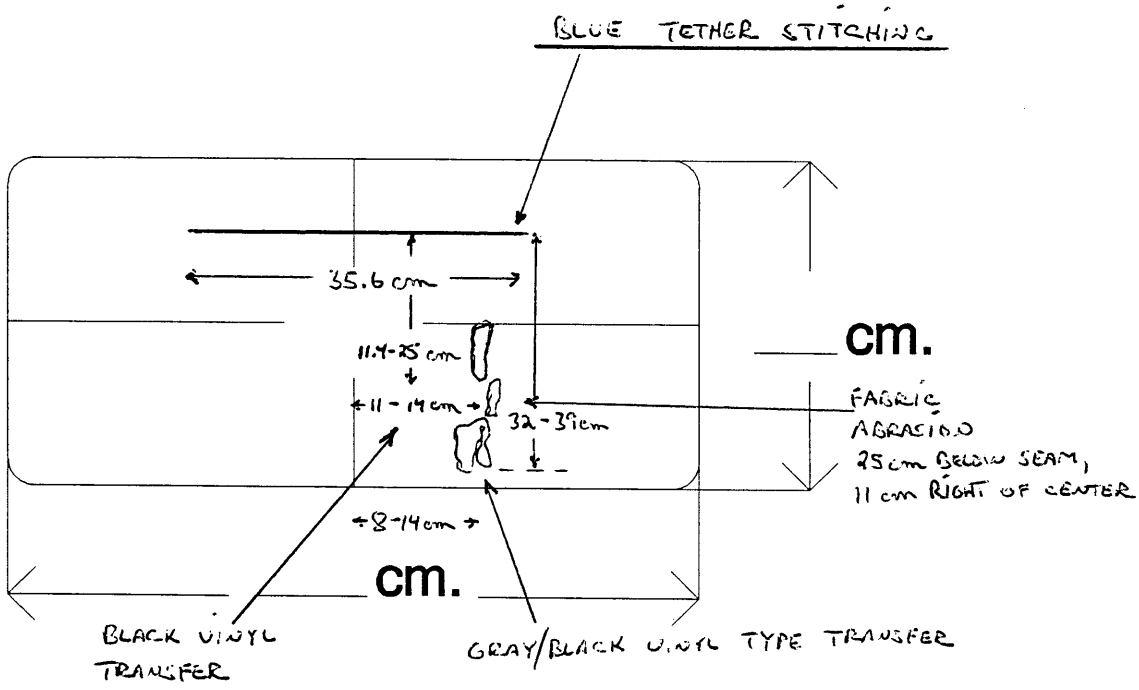
5. SKETCH OF OTHER TYPE OF AIR BAG VENT PORTS

6. SKETCH LOCATION OF CIRCULAR AIR BAG VENT PORTS

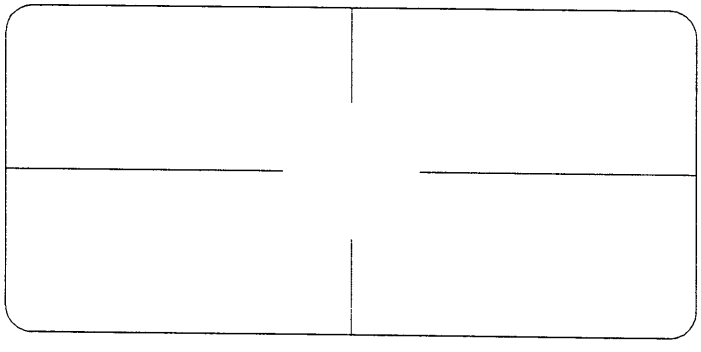


PASSENGER AIR BAG DAMAGE AND CONTACT SKETCHES

1. SKETCH DAMAGE AND CONTACT EVIDENCE ON PASSENGER AIR BAG (Front)



2. SKETCH DAMAGE AND CONTACT EVIDENCE ON PASSENGER AIR BAG (Back)

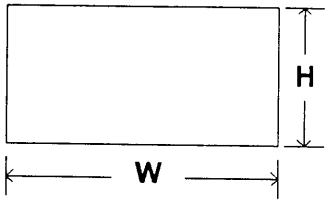


PASSENGER AIR BAG SKETCHES (Cont'd)

3. PASSENGER AIR BAG MODULE COVER FLAP SIZE (SINGLE)
 a. Flap

 width (W) 30.5cm

 height (H) 12.7 cm



4. PASSENGER AIR BAG MODULE COVER FLAP SIZE (DOUBLE)

 a. Upper Flap

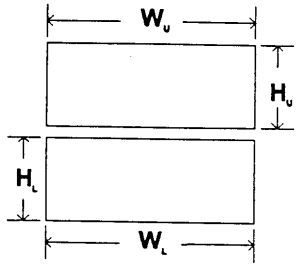
 width (W_U) _____

 height (H_U) _____

 b. Lower Flap

 width (W_L) _____

 height (H_L) _____

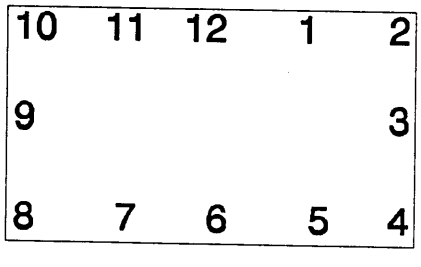


5. SKETCH OF OTHER TYPE OF AIR BAG MODULE FLAP AND SIZE

6. SKETCH OF OTHER TYPE OF AIR BAG VENT PORTS

7. SKETCH LOCATION OF RECTANGULAR AIR BAG VENT PORTS

NOT VENTED



HEAD RESTRAINTS/SEAT EVALUATION

NOTES: **Encode the applicable data for each seat position in the vehicle. The attribute for these variables may be found at the bottom of the page. Head restraint type/damage and seat type/performance should be assessed during the vehicle inspection then coded on the Occupant Assessment Form.**

		Left	Center	Right
FIRST	Head Restraint Type/Damage	3	–	3
	Seat Type	02	-	02
	Seat Performance	1	-	1
	Seat Orientation	1	–	1
	Seat Track Position	2	-	6
	Seat Back Incline Pre/Post Impact	23/23	-	23/23
SECOND	Head Restraint Type/Damage	0	0	0
	Seat Type	05	05	05
	Seat Performance	1	1	1
	Seat Orientation	1	1	1
	Seat Track Position	1	1	1
	Seat Back Incline Pre/Post Impact	23/23	23/23	23/23
THIRD	Head Restraint Type/Damage			
	Seat Type			
	Seat Performance			
	Seat Orientation			
	Seat Track Position			
	Seat Back Incline Pre/Post Impact			
OTHER	Head Restraint Type/Damage			
	Seat Type			
	Seat Performance			
	Seat Orientation			
	Seat Track Position			
	Seat Back Incline Pre/Post Impact			

DESCRIBE ANY INDICATION OF ABNORMAL OCCUPANT POSTURE

(I.E., UNUSUAL OCCUPANT CONTACT PATTERN)

HEAD RESTRAINTS/SEAT EVALUATION

Head Restraint Type/Damage by Occupant at This Occupant Position
(0) No head restraints
(1) Integral — no damage
(2) Integral — damaged during accident
(3) Adjustable — no damage
(4) Adjustable — damaged during accident
(5) Add-on — no damage
(6) Add-on — damaged during accident
(8) Other Specify):_____
(9) Unknown

Seat Type (this Occupant Position)
(00) Occupant not seated or no seat
(01) Bucket
(02) Bucket with folding back
(03) Bench
(04) Bench with separate back cushions
(05) Bench with folding back(s)
(06) Split bench with separate back cushions
(07) Split bench with folding back(s)
(08) Pedestal (i.e., column supported)
(09) Other seat type (specify):

(10) Box mounted seat (i.e., van type)
(99) Unknown

Seat Performance (this Occupant Position)
(0) Occupant not seated or no seat
(1) No seat performance failure(s)
(2) Seat adjusters failed
(3) Seat back folding locks or "seat back" failed (specify):

(4) Seat tracks/anchors failed
(5) Deformed by impact of occupant
(6) Deformed by passenger compartment intrusion (specify):
(7) Combination of above (specify):

(8) Other (specify):

(9) Unknown

Seat Orientation (this Occupant Position)
(0) Occupant not seated or no seat
(1) Forward facing seat
(2) Rear facing seat
(3) Side facing seat (inward)
(4) Side facing seat (outward)
(8) Other (specify):

(9) Unknown

Seat Track Adjusted Position Prior To Impact
(0) Occupant not seated or no seat
(1) Non-adjustable seat track

Adjustable Seat Track
(2) Seat at forward most track position
(3) Seat between forward most and middle track positions
(4) Seat at middle track position
(5) Seat between middle and rear most track positions
(6) Seat at rear most track position
(9) Unknown

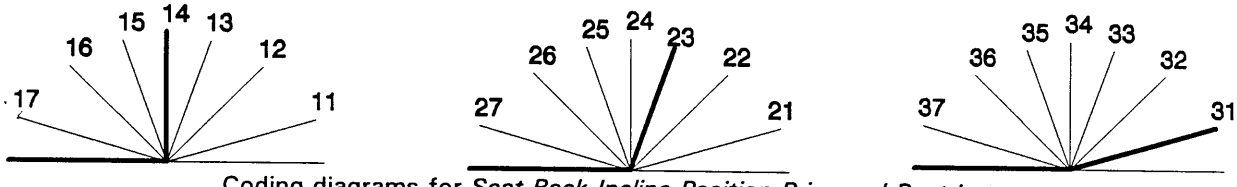
Seat Back Incline Prior and Post Impact
(00) Occupant not seated or no seat
(01) Not adjustable

Upright prior to impact
(11) Moved to completely rearward position
(12) Moved to rearward midrange position
(13) Moved to slightly rearward position
(14) Retained pre-impact position
(15) Moved to slightly forward position
(16) Moved to forward midrange position
(17) Moved to completely forward position

Slightly reclined prior to impact
(21) Moved to completely rearward position
(22) Moved to rearward midrange position
(23) Retained pre-impact postion
(24) Moved to upright position
(25) Moved to slightly forward position
(26) Moved to forward midrange position
(27) Moved to completely forward position

Completely reclined prior to impact
(31) Retained pre-impact position
(32) Moved to rearward midrange position
(33) Moved to slightly rearward position
(34) Moved to upright position
(35) Moved to slightly forward position
(36) Moved to forward midrange position
(37) Moved to completely forward position

(99) Unknown



Coding diagrams for *Seat Back Incline Position Prior and Post Impact*

DESCRIBE ANY INDICATION OF ABNORMAL OCCUPANT POSTURE (I.E., UNUSUAL OCCUPANT CONTACT PATTERN)

CHILD SAFETY SEAT FIELD ASSESSMENT

When a child safety seat is present enter the occupant's number in the first row and complete the column below the occupant's number using the codes listed below. Complete a column for each child safety seat present.

Occupant Number	02	03	04			
1. Type of Child Safety Seat	Evenflo Jonquil (1)	Unknown (4) Booster	Fisher Price (3) convertible			
2. Child Safety Seat Orientation	11	12	12			
3. Child Safety Seat Harness Usage	12 yes	NO	12 yes			
4. Child Safety Seat Shield Usage	03 N/A	N/A 03	N/A 03			
5. Child Safety Seat Tether Usage	03	03	03			
6. Child Safety Seat Make/Model	see above	Specify Below for Each Child Safety Seat				

1. Type of Child Safety Seat
 - (0) No child safety seat
 - (1) Infant seat
 - (2) Toddler seat
 - (3) Convertible seat
 - (4) Booster seat
 - (7) Other type child safety seat (specify): _____
 - (8) Unknown child safety seat type
 - (9) Unknown if child safety seat used

2. Child Safety Seat Orientation
 - (00) No child safety seat

 Designed for Rear Facing for This Age/Weight
 - (01) Rear facing
 - (02) Forward facing
 - (08) Other orientation (specify): _____
 - (09) Unknown orientation

 Designed for Forward Facing for This Age/Weight
 - (11) Rear facing
 - (12) Forward facing
 - (18) Other orientation (specify): _____
 - (19) Unknown orientation

 Unknown Design or Orientation For This Age/Weight, or Unknown Age/Weight
 - (21) Rear facing
 - (22) Forward facing
 - (28) Other orientation (specify): _____
 - (29) Unknown orientation

 - (99) Unknown if child safety seat used

3. Child Safety Seat Harness Usage

4. Child Safety Seat Shield Usage

5. Child Safety Seat Tether Usage
 Note: Options Below Are Used for Variables 3-5.
 - (00) No child safety seat

 Not Designed with Harness/Shield/Tether
 - (01) After market harness/shield/tether added, not used
 - (02) After market harness/shield/tether used
 - (03) Child safety seat used, but no after market harness/shield/tether added
 - (09) Unknown if harness/shield/tether added or used

 Designed With Harness/Shield/Tether
 - (11) Harness/shield/tether not used
 - (12) Harness/shield/tether used
 - (19) Unknown if harness/shield/tether used

 Unknown If Designed With Harness/Shield/Tether
 - (21) Harness/shield/tether not used
 - (22) Harness/shield/tether used
 - (29) Unknown if harness/shield/tether used

 - (99) Unknown if child safety seat used

6. Child Safety Seat Make/Model
 (Specify make/model and occupant number)

EJECTION/ENTRAPMENT DATA

Complete the following if the researcher has any indication that an occupant was either ejected from or entrapped in the vehicle. Code the appropriate data on the Occupant Assessment Form.

EJECTION No [✓] Yes []

Describe indications of ejection and body parts involved in partial ejection(s):

Occupant Number						
Ejection						
(Note on Vehicle Interior Sketch) Ejection Area						
Ejection Medium						
Medium Status						

Ejection
(1) Complete ejection
(2) Partial ejection
(3) Ejection, Unknown degree
(9) Unknown

Ejection Area
(1) Windshield
(2) Left front
(3) Right front
(4) Left rear
(5) Right rear
(6) Rear
(7) Roof
(8) Other area (e.g., back of pickup, etc.) (specify): _____
(9) Unknown

Ejection Medium
(1) Door/hatch/tailgate
(2) Nonfixed roof structure
(3) Fixed glazing
(4) Nonfixed glazing (specify): _____
(5) Integral structure
(8) Other medium (specify): _____
(9) Unknown

Medium Status (Immediately Prior to Impact)
(1) Open
(2) Closed
(3) Integral structure
(9) Unknown

ENTRAPMENT No [✓] Yes []

Describe entrapment mechanism: _____

Component(s): _____

(Note in vehicle interior diagram)

ATTACHMENT C:

NASS Occupant Forms

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U.S. Department of Transportation
National Highway Traffic Safety Administration

OCCUPANT ASSESSMENT FORM

Form Approved
O.M.B. No. 2127-0021

NATIONAL ACCIDENT SAMPLING SYSTEM
CRASHWORTHINESS DATA SYSTEM

1. ~~Primary Sampling Unit Number~~ ____
2. Case Number - Stratum 95 22
3. Vehicle Number 01
4. Occupant Number 02

OCCUPANT'S CHARACTERISTICS

5. Occupant's Age 00
Code actual age at time of accident.
(00) Less than one year old (specify by month): 4 MONTHS
(97) 97 years and older
(99) Unknown

6. Occupant's Sex 1
(1) Male
(2) Female-not reported pregnant
(3) Female-pregnant-1st trimester(1st-3rd month)
(4) Female-pregnant-2nd trimester(4th-6th month)
(5) Female-pregnant-3rd trimester(7th-9th month)
(6) Female-pregnant-term unknown
(9) Unknown

7. Occupant's Height 062
Code actual height to the nearest centimeter.
(999) Unknown

24.25 inches X 2.54 = 062 centimeters

8. Occupant's Weight 008
Code actual weight to the nearest kilogram.
(999)Unknown

17 pounds X .4536 = 7.7 kilograms

9. Occupant's Role 2
(1) Driver
(2) Passenger
(9) Unknown

OCCUPANT'S SEATING

10. Occupant's Seat Position 13
Front Seat
(11) Left side
(12) Middle
(13) Right side
(14) Other (specify): ____
(15) On or in the lap of another occupant

Second Seat
(21) Left side
(22) Middle
(23) Right side
(24) Other (specify): ____
(25) On or in the lap of another occupant

Third Seat
(31) Left side
(32) Middle
(33) Right side
(34) Other (specify): ____
(35) On or in the lap of another occupant

Fourth Seat
(41) Left side
(42) Middle
(43) Right side
(44) Other (specify): ____
(45) On or in the lap of another occupant

(97) In or on unenclosed area
(98) Other seat (specify): ____
(99) Unknown

11. Occupant's Posture 6
(0) Normal posture

Abnormal posture
(1) Kneeling or standing on seat
(2) Lying on or across seat
(3) Kneeling, standing or sitting in front of seat
(4) Sitting sideways or turned to talk with another occupant or to look out a rear window
(5) Sitting on a console
(6) Lying back in a reclined seat position
(7) Bracing with feet or hands on a surface in front of seat
(8) Other abnormal posture (specify): ____
(9) Unknown

HS Form 433A (1/95)

This report is authorized by P.L. 89-563, Title 1, Section 106, 108, and 112. While you are not required to respond, your cooperation is needed to make the results of this data collection effort comprehensive, accurate, and timely.

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EJECTION/ENTRAPMENT

12. Ejection 0
 (0) No ejection
 (1) Complete ejection
 (2) Partial ejection
 (3) Ejection, unknown degree
 (9) Unknown

13. Ejection Area 0
 (0) No ejection
 (1) Windshield
 (2) Left front
 (3) Right front
 (4) Left rear
 (5) Right rear
 (6) Rear
 (7) Roof
 (8) Other area (e.g., back of pickup, etc.) (specify):
 (9) Unknown

14. Ejection Medium 0
 (0) No ejection
 (1) Door/hatch/tailgate
 (2) Nonfixed roof structure
 (3) Fixed glazing
 (4) Nonfixed glazing (specify):
 (5) Integral structure
 (8) Other medium (specify):
 (9) Unknown

15. Medium Status (Immediately Prior To Impact) 0
 (0) No ejection
 (1) Open
 (2) Closed
 (3) Integral structure
 (9) Unknown

16. Entrapment 0
 (0) Not entrapped/exit not inhibited
 (1) Entrapped/pinned - mechanically restrained
 (2) Could not exit vehicle due to jammed doors, fire, etc. (specify):
 (9) Unknown

17. Occupant Mobility 1
 (0) Occupant fatal before removed from vehicle
 (1) Removed from vehicle while unconscious or disoriented
 (2) Removed from vehicle due to injuries
 (3) Exited vehicle with some assistance
 (4) Exited vehicle under own power
 (5) Occupant fully ejected
 (9) Unknown

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BELT SYSTEM FUNCTION

18. Manual (Active) Belt System Availability 4
(0) None available
(1) Belt removed/destroyed
(2) Shoulder belt
(3) Lap belt
(4) Lap and shoulder belt
(5) Belt available—type unknown

Integral Belt Partially Destroyed
(6) Shoulder belt (lap belt destroyed/removed)
(7) Lap belt (shoulder belt destroyed/removed)
(8) Other belt (specify):
(9) Unknown

19. Manual (Active) Belt System Use 13
(00) None used, not available, or belt removed/destroyed
(01) Inoperative (specify):
(02) Shoulder belt
(03) Lap belt
(04) Lap and shoulder belt
(05) Belt used—type unknown
(08) Other belt used (specify):
(12) Shoulder belt used with child safety seat
(13) Lap belt used with child safety seat
(14) Lap and shoulder belt used with child safety seat
(15) Belt used with child safety seat—type unknown
(18) Other belt used with child safety seat (specify):
(99) Unknown if belt used

20. Proper Use of Manual (Active) Belts 1
(0) None used or not available
(1) Belt used properly
(2) Belt used properly with child safety seat

Belt Used Improperly
(3) Shoulder belt worn under arm
(4) Shoulder belt worn behind back or seat
(5) Belt worn around more than one person
(6) Lap belt worn on abdomen
(7) Lap belt or lap and shoulder belt used improperly with child safety seat (specify):
(8) Other improper use of manual belt system (specify):
(9) Unknown

21. Manual (Active) Belt Failure Modes During Accident 1
(0) No manual belt used or not available
(1) No manual belt failure(s)
(2) Torn webbing (stretched webbing not included)
(3) Broken buckle or latchplate
(4) Upper anchorage separated
(5) Other anchorage separated (specify):
(6) Broken retractor
(7) Combination of above (specify):
(8) Other manual belt failure (specify):
(9) Unknown

22. Shoulder Belt Upper Anchorage Adjustment 1
(0) No shoulder belt
(1) No upper anchorage adjustment for shoulder belt

Adjustable shoulder Belt Upper Anchorage
(2) In full up position
(3) In mid position
(4) In full down position
(5) Position unknown
(9) Unknown if position has adjustable upper anchorage adjustment

23. Automatic (Passive) Belt System Availability/ Function 0
(0) Not equipped/not available
(1) 2 point automatic belts
(2) 3 point automatic belts
(3) Automatic belts - type unknown

Non-functional
(4) Automatic belts destroyed or rendered inoperative
(9) Unknown

24. Automatic (Passive) Belt System Use 0
(0) Not equipped/not available/destroyed or rendered inoperative
(1) Automatic belt in use
(2) Automatic belt not in use (manually disconnected, motorized track inoperative) (specify):
(3) Automatic belt use unknown
(9) Unknown

25. Automatic (Passive) Belt System Type 0
(0) Not equipped/not available
(1) Non-motorized system
(2) Motorized system
(9) Unknown

26. Proper Use of Automatic (Passive) Belt System 0
(0) Not equipped/not available/not used
(1) Automatic belt used properly
(2) Automatic belt used properly with child safety seat

Automatic Belt Used Improperly
(3) Automatic shoulder belt worn under arm
(4) Automatic shoulder belt worn behind back
(5) Automatic belt worn around more than one person
(6) Lap portion of automatic belt worn on abdomen
(7) Automatic lap and shoulder belt or automatic shoulder belt used improperly with child safety seat (specify):
(8) Other improper use of automatic belt system (specify):
(9) Unknown

27. Automatic (Passive) Belt Failure Modes During Accident 0
(0) Not equipped/not available/not in use
(1) No automatic belt failure(s)
(2) Torn webbing (stretched webbing not included)
(3) Broken buckle or latchplate
(4) Upper anchorage separated
(5) Other anchorage separated (specify):
(6) Broken retractor
(7) Combination of above (specify):
(8) Other automatic belt failure (specify):
(9) Unknown

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POLICE REPORTED RESTRAINT USE

28. Police Reported Belt Use — 6
 (0) None used
 (1) Police did not indicate belt use
 (2) Shoulder belt
 (3) Lap belt
 (4) Lap and shoulder belt
 (5) Belt used, type not specified
 (6) Child safety seat
 (7) Automatic belt
 (8) Other type belt, (specify): _____
 (9) Police indicated "unknown"

29. Police Reported Air Bag Availability/Function — 2
 (0) No air bag available
 (1) Police did not indicate air bag availability/function
 (2) Deployed
 (3) Not deployed
 (4) Unknown if deployed
 (9) Police indicated "unknown"

Check the Primary Source Used In Determining Belt Use.

[] Not equipped/not available/destroyed or rendered inoperative
[✓] Vehicle inspection
[] Official injury data
[] Driver/occupant interview
[] Other (specify): _____
[] Unknown if belt used

AIR BAG SYSTEM FUNCTION

30. Frontal Air Bag System Availability/Function (This Occupant Position) — 1
 (0) Not equipped/not available
 (1) Air bag

 Non-functional
 (2) Air bag disconnected (specify): _____
 (3) Air bag not reinstalled
 (9) Unknown

31. Frontal Air Bag System Deployment (This Occupant Position) — 1
 (0) Not equipped/not available
 (1) Deployed during accident (as a result of impact)
 (2) Deployed inadvertently just prior to accident
 (3) Deployed, details unknown
 (4) Deployed as a result of a noncollision event during accident sequence (e.g., fire, explosion, electrical)
 (5) Unknown if deployed
 (7) Nondeployed
 (9) Unknown

32. Other Than First Seat Frontal Air Bag Availability/Function (This Occupant Position) — 0
 (0) Not equipped/not available
 (1) Air bag

 Non-functional
 (2) Air bag disconnected (specify): _____
 (3) Air bag not reinstalled
 (9) Unknown

 Specify type of "other" air bag present: _____

33. Air Bag(s) Deployment, Other Than First Seat Frontal (This Occupant Position) — 0
 (0) Not equipped with an "other" air bag
 (1) Deployed during accident (as a result of impact)
 (2) Deployed inadvertently just prior to accident
 (3) Deployed, details unknown
 (4) Deployed as a result of a noncollision event during accident sequence (e.g., fire, explosion, electrical)
 (5) Unknown if deployed
 (7) Nondeployed
 (9) Unknown

34. Are There Indications of Air Bag System Failure? (This Occupant Position) — 1
 (0) Not equipped/not available
 (1) No
 (2) Yes (specify): _____
 (9) Unknown

FIRST SEAT FRONTAL AIR BAG SYSTEM EVALUATION

35. Had Vehicle Been in Previous Accident(s)? 2
(0) Not equipped/not available
(1) No previous accidents

Yes Very minor front fascia damage
(2) Previous accident(s) without deployment(s)
(3) One previous accident with deployment
(4) More than one previous accident with at least one deployment
(8) Previous accidents, unknown deployment status
(9) Unknown

36. Type of Air Bag 1
(0) Not equipped/not available
(1) Original manufacturer installed system
(2) Retrofitted air bag
(3) Replacement air bag
(8) Unknown type of air bag
(9) Unknown

37. Had Any Prior Maintenance/Service Been Performed On This Air Bag System? 1
(0) Not equipped/not available
(1) No prior maintenance
(2) Yes, prior maintenance (specify): _____
(9) Unknown

38. Air Bag Deployment Accident Event Sequence Number 01
(00) Not equipped/not available
_____ Code the accident event sequence number that initiated the air bag deployment
(96) Deployed, unknown event
(97) Not deployed
(98) Unknown if deployed
(99) Unknown

39. CDC For Air Bag Deployment Impact 1
(0) Not equipped/not available
(1) Highest delta V
(2) Second highest delta V
(3) Other non-coded delta V (specify): _____
(6) Deployed, unknown event
(7) Not deployed
(8) Unknown if deployed
(9) Unknown

40. Longitudinal Component of Delta V For Air Bag Deployment Impact +/- 999
(_000) Not equipped/not available
Code the value of the delta V for the impact that initiated the air bag deployment
(_996) Deployment, unknown longitudinal Delta V
(_997) Not deployed
(_998) Unknown if deployed
(_999) Unknown

41. Did Air Bag Module Cover Flap(s) Open At Designated Tear Points? 2
(0) Not equipped/not available
(1) No
(2) Yes
(3) Deployed, unknown if flap(s) opened at designated tear points
(7) Not deployed
(8) Unknown if deployed
(9) Unknown

42. Were Air Bag Module Cover Flap(s) Damaged? 1
(0) Not equipped/not available
(1) No
(2) Yes (specify): _____
(3) Deployed, unknown if air bag module cover flap(s) damaged
(7) Not deployed
(8) Unknown if deployed
(9) Unknown

43. Was There Damage To The Air Bag? 07
(00) Not equipped/not available
(01) Not damaged

Yes - Air Bag Damage
(02) Ruptured
(03) Cut
(04) Torn
(05) Holed
(06) Burned
(07) Abraded
(88) Other damage (specify): _____
(95) Damaged, details unknown
(96) Deployed, unknown if damaged
(97) Not deployed
(98) Unknown if deployed
(99) Unknown

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FIRST SEAT FRONTAL AIR BAG SYSTEM EVALUATION *continued*

44. Source of Air Bag Damage 88
(00) Not equipped/not available
(01) Not damaged
(02) Object worn by occupant, (specify):
(03) Object carried by occupant, (specify):
(04) Adaptive/assistive controls, (specify):
(05) Fire in vehicle
(06) Thermal burns
(07) Rescue or emergency efforts
(88) Other damage source (specify): CHILD SAFETY SEAT
(95) Damaged, unknown source
(96) Deployed, unknown if damaged
(97) Not deployed
(98) Unknown if deployed
(99) Unknown

45. Was The Air Bag Tethered? 2
(0) Not equipped/not available
(1) No
(2) Yes (specify number of tether straps): 2 WIDE BANDS
(3) Deployed, unknown if tethered
(7) Not deployed
(8) Unknown if deployed
(9) Unknown

46. Did The Air Bag Have Vent Ports? 1
(0) Not equipped/not available
(1) No
(2) Yes (specify number of vent ports):
(3) Deployed, unknown if vent ports present
(7) Not deployed
(8) Unknown if deployed
(9) Unknown

47. Was the Air Bag in this Occupant's Position Contacted by Another Occupant? 1
(0) Not equipped/not available
(1) No
(2) Yes (specify):
(3) Deployed, unknown if other occupant contact to air bag
(7) Not deployed
(8) Unknown if deployed
(9) Unknown

48. Was This Occupant Wearing Eye-wear? 1
(0) Not equipped/not available
(1) No
(2) Eyeglasses/sunglasses
(3) Contact lenses
(4) Deployed, unknown if eyewear worn
(7) Not deployed
(8) Unknown if deployed
(9) Unknown

HEAD RESTRAINT AND SEAT EVALUATION

49. Head Restraint Type/Damage by Occupant at This Occupant Position 3
(0) No head restraints
(1) Integral—no damage
(2) Integral—damaged during accident
(3) Adjustable—no damage
(4) Adjustable—damaged during accident
(5) Add-on—no damage
(6) Add-on—damaged during accident
(8) Other (specify):
(9) Unknown

50. Seat Type (this Occupant Position) 02
(00) Occupant not seated or no seat
(01) Bucket
(02) Bucket with folding back
(03) Bench
(04) Bench with separate back cushions
(05) Bench with folding back(s)
(06) Split bench with separate back cushions
(07) Split bench with folding back(s)
(08) Pedestal (i.e., column supported)
(09) Box mounted seat (i.e., van type)
(10) Other seat type (specify):
(99) Unknown

51. Seat Orientation (this Occupant Position) 1
(0) Occupant not seated or no seat
(1) Forward facing seat
(2) Rear facing seat
(3) Side facing seat (inward)
(4) Side facing seat (outward)
(8) Other (specify):
(9) Unknown

52. Seat Track Adjusted Position Prior To Impact 6
(0) Occupant not seated or no seat
(1) Non-adjustable seat track

Adjustable Seat Track
(2) Seat at forward most track position
(3) Seat between forward most and middle track positions
(4) Seat at middle track position
(5) Seat between middle and rear most track positions
(6) Seat at rear most track position
(9) Unknown

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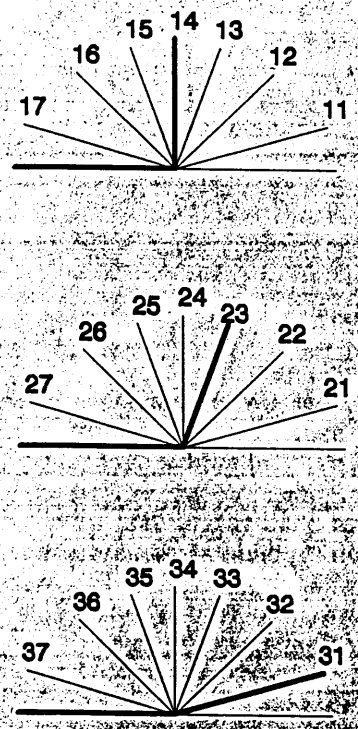
HEAD RESTRAINT AND SEAT EVALUATION *continued*

53. Seat Back Incline Prior and Post Impact 23
- (00) Occupant not seated or no seat
- (01) Not adjustable

Upright prior to impact
- (11) Moved to completely rearward position
- (12) Moved to rearward midrange position
- (13) Moved to slightly rearward position
- (14) Retained pre-impact position
- (15) Moved to slightly forward position
- (16) Moved to forward midrange position
- (17) Moved to completely forward position

Slightly reclined prior to impact
- (21) Moved to completely rearward position
- (22) Moved to rearward midrange position
- (23) Retained pre-impact position
- (24) Moved to upright position
- (25) Moved to slightly forward position
- (26) Moved to forward midrange position
- (27) Moved to completely forward position

Completely reclined prior to impact
- (31) Retained pre-impact position
- (32) Moved to rearward midrange position
- (33) Moved to slightly rearward position
- (34) Moved to upright position
- (35) Moved to slightly forward position
- (36) Moved to forward midrange position
- (37) Moved to completely forward position
- (99) Unknown



54. Seat Performance (this Occupant Position) 1
- (0) Occupant not seated or no seat
- (1) No seat performance failure(s)
- (2) Seat adjusters failed
- (3) Seat back folding locks or "seat back" failed (specify): _____
- (4) Seat track/anchors failed
- (5) Deformed by impact of occupant
- (6) Deformed by passenger compartment intrusion, (specify): _____
- (7) Combination of above (specify): _____
- (8) Other (specify): _____
- (9) Unknown

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CHILD SAFETY SEAT

55. Child Safety Seat Make/Model 115
(000) No child safety seat
Applicable codes are found in your NASS CDS Data Collection, Coding and Editing
(950) Built-in child safety seat
(997) Other make/model (specify): _____
(998) Unknown make/model
(999) Unknown if child safety seat used

56. Type of Child Safety Seat 1
(0) No child safety seat
(1) Infant seat
(2) Toddler seat
(3) Convertible seat
(4) Booster seat - with shield
(5) Booster seat - without shield
(7) Other type child safety seat (specify): _____
(8) Unknown child safety seat type
(9) Unknown if child safety seat used

57. Child Safety Seat Orientation 01
(00) No child safety seat

Designed for Rear Facing for This Age/Weight
(01) Rear facing
(02) Forward facing
(08) Other orientation (specify): _____
(09) Unknown orientation

Designed For Forward Facing for This Age/Weight
(11) Rear facing
(12) Forward facing
(18) Other orientation (specify): _____
(19) Unknown orientation

Unknown Design or Orientation For This Age/Weight, or Unknown Age/Weight
(21) Rear facing
(22) Forward facing
(28) Other orientation (specify): _____
(29) Unknown orientation

(99) Unknown if child safety seat used

58. Child Safety Seat Harness Usage 12

59. Child Safety Seat Shield Usage 03

60. Child Safety Seat Tether Usage 03

Note: Options below applicable to Variables OA58-OA60.
(00) No child safety seat

Not Designed With Harness/Shield/Tether
(01) After market harness/shield/tether added, not used
(02) After market harness/shield/tether used
(03) Child safety seat used, but no after market harness/shield/tether added
(09) Unknown if harness/shield/tether added or used

Designed With Harness/Shield/Tether
(11) Harness/shield/tether not used
(12) Harness/shield/tether used
(19) Unknown if harness/shield/tether used

Unknown If Designed With Harness/Shield/Tether
(21) Harness/shield/tether not used
(22) Harness/shield/tether used
(29) Unknown if harness/shield/tether used

(99) Unknown if child safety seat used

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INJURY CONSEQUENCES

61. Injury Severity (Police Rating) 4

(0) O - No injury
(1) C - Possible injury
(2) B - Nonincapacitating injury
(3) A - Incapacitating injury
(4) K - Killed
(5) U - Injury, severity unknown
(6) Died prior to accident
(9) Unknown

62. Treatment - Mortality 1

(0) No treatment
(1) Fatal
(2) Fatal - ruled disease (specify):

Nonfatal
(3) Hospitalization
(4) Transported and released
(5) Treatment at scene - nontransported
(6) Treatment later
(7) Treatment - other (specify):

(8) Transported to a medical facility-unknown if treated
(9) Unknown

63. Type Of Medical Facility (for Initial Treatment) 2

(0) Not treated at a medical facility
(1) Trauma center
(2) Hospital
(3) Medical clinic
(4) Physician's office
(5) Treatment later at medical facility
(8) Other (specify):

(9) Unknown

64. Hospital Stay 01

(00) Not Hospitalized
____Code the number of days (up through 60) that the occupant stayed in hospital.
(61) 61 days or more
(99) Unknown

65. Working Days Lost 62

____Code the number of days (up through 60) that the occupant lost from work due to the accident
(00) No working days lost
(61) 61 days or more
(62) Fatally injured
(97) Not working prior to accident
(99) Unknown

STOP WORK HERE

VARIABLES 66-74

TO BE CODED BY THE ZONE CENTER

TO BE CODED BY THE ZONE CENTER

INJURY CONSEQUENCES

66. Time to Death 31
_____Code number of hours from time of accident to time of death up through 24 hours. If time of death is greater than 24 hours, code number of days. (Note: 1 day = 31, 2 days = 32, ... n days = 30 +n up through 30 days = 60)
(00) Not fatal
(96) Fatal - ruled disease
(99) Unknown

67. 1st Medically Reported Cause of Death 01

68. 2nd Medically Reported Cause of Death 06

69. 3rd Medically Reported Cause of Death 07
_____Code the Occupant Injury from line number(s) for the medically reported injury(s) which reportedly contributed to this occupant's death
(00) Not fatal or no additional causes
(96) Mode of death given but specific injuries are not linked to cause of death. (specify):

(97) Other result (includes fatal ruled disease) (specify):

(99) Unknown

70. Number of Recorded Injuries for This Occupant 15
_____Code the actual number of injuries recorded for this occupant.
(00) No recorded injuries
(97) Injured, details unknown
(99) Unknown if injured

TRAUMA DATA

71. Glasgow Coma Scale (GCS) Score (at Medical Facility) 02
(00) Not injured
(01) Injured - not treated at medical facility
(02) No GCS Score at medical facility
(03-15) Code the actual value of the initial GCS Score recorded at medical facility.
(97) Injured, details unknown
(99) Unknown if injured

72. Was the Occupant Given Blood? 1
(1) No - blood not given
(2) Yes - blood given
(specify units):_____
(9) Unknown if blood given

73. Arterial Blood Gases (ABG) – HCO_3 01
(00) Not injured
(01) Injured, ABGs not measured or reported
(02-50) Code the actual value of the HCO_3
(96) ABGs reported , HCO_3 unknown
(97) Injured, details unknown
(99) Unknown if injured

BELT USE DETERMINATION

74. Primary Source of Belt Use Determination 1
(0) Not equipped/not available/destroyed or rendered inoperative
(1) Vehicle inspection
(2) Official injury data
(3) Driver/occupant interview
(8) Other (specify):_____
(9) Unknown if belt used

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U.S. Department of Transportation
National Highway Traffic Safety Administration

OCCUPANT INJURY FORM

Form Approved
O.M.B. No. 2127-0021
NATIONAL ACCIDENT SAMPLING SYSTEM
CRASHWORTHINESS DATA SYSTEM

1. ~~Primary Sampling Unit Number~~ ____
2. Case Number - Stratum 95-22
3. Vehicle Number 01
4. Occupant Number 02

INJURY DATA

Record below the actual injuries sustained by this occupant that were identified from the official and unofficial data sources. Remember not to double count an injury just because it was identified from two different sources. If greater than ten injuries have been documented, encode the balance on the Occupant Injury Supplement.

	Source of Injury Data	A.I.S. - 90 Body Region	Type of Anatomic Structure	Specific Anatomic Structure	Level of Injury	A.I.S. Severity	Aspect	Injury Source	Injury Source Confidence Level	Direct/ Indirect Injury	Occupant Area Intrusion Number
1st	5. 1	6. 1	7. 4	8. 06	9. 66	10. 5	11. 0	12. 180	13. 1	14. 1	15. 00
2nd	16. 1	17. 1	18. 4	19. 02	20. 02	21. 5	22. 8	23. 180	24. 1	25. 1	26. 00
3rd	27. 1	28. 1	29. 4	30. 06	31. 56	32. 5	33. 1	34. 180	35. 1	36. 1	37. 00
4th	38. 1	39. 1	40. 4	41. 06	42. 34	43. 5	44. 3	45. 180	46. 1	47. 1	48. 00
5th	49. 1	50. 1	51. 5	52. 02	53. 06	54. 4	55. 8	56. 180	57. 1	58. 1	59. 00
6th	60. 1	61. 1	62. 5	63. 04	64. 06	65. 4	66. 1	67. 180	68. 1	69. 1	70. 00
7th	71. 1	72. 1	73. 5	74. 04	75. 04	76. 3	77. 2	78. 180	79. 1	80. 1	81. 00
8th	82. 1	83. 1	84. 4	85. 06	86. 52	87. 4	88. 2	89. 180	90. 1	91. 1	92. 00
9th	93. 1	94. 1	95. 4	96. 06	97. 88	98. 4	99. 1	100. 180	101. 1	102. 1	103. 00
10th	104. 1	105. 1	106. 4	107. 06	108. 52	109. 4	110. 2	111. 180	112. 1	113. 1	114. 00

HS Form 433B (1/95)

This report is authorized by P.L. 89-563, Title 1, Section 106, 108, and 112. While you are not required to respond, your cooperation is needed to make the results of this data collection effort comprehensive, accurate, and timely.

OCCUPANT INJURY DATA

	Source of Injury Data	A.I.S. - 90 Body Region	Type of Anatomic Structure	Specific Anatomic Structure	Level of Injury	A.I.S. Severity	Aspect	Injury Source	Injury Source Confidence Level	Direct/ Indirect Injury	Occupant Area Intrusion Number
11th	1	1	4	06	52	4	1	180	1	1	00
12th	1	1	4	04	50	3	8	180	1	1	00
13th	1	4	4	22	02	3	3	180	1	1	00
14th	1	1	9	04	02	1	0	180	1	1	00
15th	2	1	4	06	20	3	3	180	1	1	00
16th	—	—	—	— —	— —	—	—	— — —	—	—	— —
17th	—	—	—	— —	— —	—	—	— — —	—	—	— —
18th	—	—	—	— —	— —	—	—	— — —	—	—	— —
19th	—	—	—	— —	— —	—	—	— — —	—	—	— —
20th	—	—	—	— —	— —	—	—	— — —	—	—	— —
21st	—	—	—	— —	— —	—	—	— — —	—	—	— —
22nd	—	—	—	— —	— —	—	—	— — —	—	—	— —
23rd	—	—	—	— —	— —	—	—	— — —	—	—	— —
24th	—	—	—	— —	— —	—	—	— — —	—	—	— —
25th	—	—	—	— —	— —	—	—	— — —	—	—	— —

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OCCUPANT INJURY CLASSIFICATION

Body Region

(1) Head
(2) Face
(3) Neck
(4) Thorax
(5) Abdomen
(6) Spine
(7) Upper Extremity
(8) Lower Extremity
(9) Unspecified

Type of Anatomic Structure

(1) Whole Area
(2) Vessels
(3) Nerves
(4) Organs (includes Muscles/ligaments)
(5) Skeletal (includes joints)
(6) Head - LOC
(9) Skin

Specific Anatomic Structure

Vessels, Nerves, Organs. Bones, Joints are assigned consecutive two digit numbers beginning with 02.

The exceptions to this rule apply to:

Whole Area
(02) Skin - Abrasion
(04) Skin - Contusion
(06) Skin - Laceration
(08) Skin - Avulsion
(10) Amputation
(20) Burn
(30) Crush
(40) Degloving
(50) Injury - NFS
(90) Trauma, other than mechanical

Head - LOC
(02) Length of LOC
(04) Level
(06) of
(08) Consciousness
(10) Concussion

Spine
(02) Cervical
(04) Thoracic
(06) Lumbar

Level of Injury

Specific injuries are assigned consecutive two-digit numbers beginning with 02.

To the extent possible, within the organizational framework of the AIS, 00 is assigned to an injury NFS as to severity or where only one injury is given in the dictionary for that anatomic structure. 99 is assigned to any injury NFS as to lesion or severity.

Abbreviated Injury Scale

(1) Minor Injury
(2) Moderate Injury
(3) Serious Injury
(4) Severe Injury
(5) Critical Injury
(6) Maximum (untreatable)
(7) Injured, unknown severity

Aspect

(1) Right
(2) Left
(3) Bilateral
(4) Central
(5) Anterior
(6) Posterior
(7) Superior
(8) Inferior
(9) Unknown
(0) Whole region

SOURCE OF INJURY DATA

OFFICIAL RECORDS
(1) Autopsy records with or without hospital/medical records
(2) Hospital/medical records other than emergency room (e.g., discharge summary)
(3) Emergency room records only (including associated X-rays or other lab reports)
(4) Private physician, walk-in or emergency clinic

UNOFFICIAL RECORDS
(5) Lay coroner report
(6) E.M.S. personnel
(7) Interviewee
(8) Other source (specify): _____
(9) Police

INJURY SOURCE CONFIDENCE LEVEL

(1) Certain
(2) Probable
(3) Possible
(9) Unknown

DIRECT/INDIRECT INJURY

(1) Direct contact injury
(2) Indirect contact injury
(3) Noncontact injury
(7) Injured, unknown source

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INJURY SOURCES

FRONT
(001) Windshield
(002) Mirror
(003) Sunvisor
(004) Steering wheel rim
(005) Steering wheel hub/spoke
(006) Steering wheel (combination of codes 004 and 005)
(007) Steering column, transmission selector lever, other attachment
(008) Cellular telephone or CB radio
(009) Add on equipment (e.g., tape deck, air conditioner)
(010) Left instrument panel and below
(011) Center instrument panel and below
(012) Right instrument panel and below
(013) Glove compartment door
(014) Knee bolster
(015) Windshield including one or more of the following: front header, A (A1/A2)-pillar, instrument panel, mirror, or steering assembly (driver side only)
(016) Windshield including one or more of the following: front header, A (A1/A2)-pillar, instrument panel, or mirror (passenger side only)
(017) Windshield reinforced by exterior object (specify)

(019) Other front object (specify):

LEFT SIDE
(051) Left side interior surface, excluding hardware or armrests
(052) Left side hardware or armrest
(053) Left A (A1/A2)-pillar
(054) Left B-pillar
(055) Other left pillar (specify):

(056) Left side window glass
(057) Left side window frame
(058) Left side window sill
(059) Left side window glass including one or more of the following: frame, window sill, A (A1/A2)-pillar, B-pillar, or roof side rail.
(060) Other left side object (specify):

RIGHT SIDE
(101) Right side interior surface, excluding hardware or armrests
(102) Right side hardware or armrest
(103) Right A (A1/A2)-pillar
(104) Right B-pillar
(105) Other right pillar (specify):

(106) Right side window glass
(107) Right side window frame
(108) Right side window sill
(109) Right side window glass including one or more of the following: frame, window sill, A (A1/A2)-pillar, B-pillar, or roof side rail.
(110) Other right side object (specify):

INTERIOR
(151) Seat, back support
(152) Belt restraint webbing/buckle
(153) Belt restraint B-pillar or door frame attachment point
(154) Other restraint system component (specify):

(155) Head restraint system
(160) Other occupants (specify):

(161) Interior loose objects
(162) Child safety seat (specify):

(163) Other interior object (specify):

AIR BAG
(170) Air bag-driver side
(171) Air bag-driver side and eyewear
(172) Air bag-driver side and jewelry
(173) Air bag-driver side and object held
(174) Air bag-driver side and object in mouth
(175) Air bag compartment cover-driver side
(176) Air bag compartment cover-driver side and eyewear
(177) Air bag compartment cover-driver side and jewelry
(178) Air bag compartment cover-driver side and object held
(179) Air bag compartment cover-driver side and object in mouth
(180) Air bag-passenger side
(181) Air bag-passenger side and eyewear
(182) Air bag-passenger side and jewelry
(183) Air bag-passenger side and object held
(184) Air bag-passenger side and object in mouth
(185) Air bag compartment cover-passenger side
(186) Air bag compartment cover-passenger side and eyewear
(187) Air bag compartment cover-passenger side and jewelry
(188) Air bag compartment cover-passenger side and object held
(189) Air bag compartment cover-passenger side and object in mouth
(190) Other air bag (specify)

(195) Other air bag compartment cover (specify)

ROOF
(201) Front header
(202) Rear header
(203) Roof left side rail
(204) Roof right side rail
(205) Roof or convertible top

FLOOR
(251) Floor (including toe pan)
(252) Floor or console mounted transmission lever, including console
(253) Parking brake handle
(254) Foot controls including parking brake

REAR
(301) Backlight (rear window)
(302) Backlight storage rack, door, etc.
(303) Other rear object (specify):

ADAPTIVE (ASSISTIVE) DRIVING EQUIPMENT
(401) Hand controls for braking/acceleration
(402) Steering control devices (attached to OEM steering wheel)
(403) Steering knob attached to steering wheel
(405) Replacement steering wheel (i.e., reduced diameter)
(406) Joy stick steering controls
(407) Wheelchair tie-downs
(408) Modification to seat belts, (specify):
(409) Additional or relocated switches, (specify):

(410) Raised roof
(411) Wall mounted head rest (used behind wheel chair)
(412) Other adaptive device (specify):

EXTERIOR of OCCUPANT'S VEHICLE
(451) Hood
(452) Outside hardware (e.g., outside mirror, antenna)
(453) Other exterior surface or tires (specify):

(454) Unknown exterior objects

EXTERIOR OF OTHER MOTOR VEHICLE
(501) Front bumper
(502) Hood edge
(503) Other front of vehicle (specify):

(504) Hood
(505) Hood ornament
(506) Windshield, roof rail, A-pillar
(507) Side surface
(508) Side mirrors
(509) Other side protrusions (specify):

(510) Rear surface
(511) Undercarriage
(512) Tires and wheels
(513) Other exterior of other motor vehicle (specify):

(514) Unknown exterior of other motor vehicle

OTHER VEHICLE OR OBJECT IN THE ENVIRONMENT
(551) Ground
(598) Other vehicle or object (specify):

(599) Unknown vehicle or object

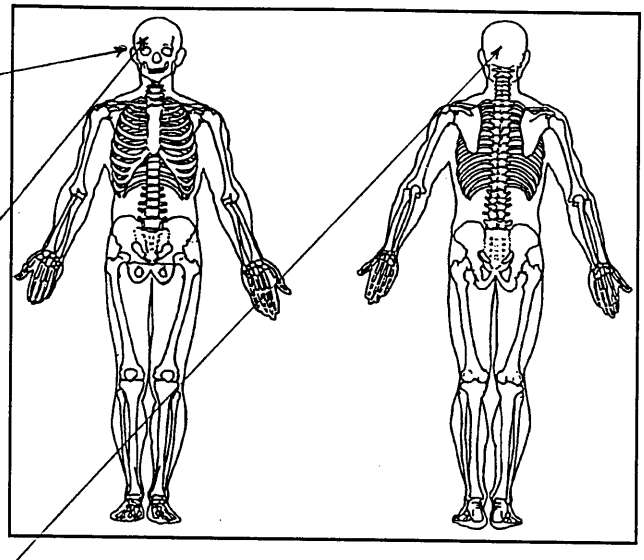
NONCONTACT INJURY
(601) Fire in vehicle
(602) Flying glass
(603) Other noncontact injury source (specify):
(604) Air bag exhaust gases
(697) Injured, unknown source

SKELETAL

Branching fractures into the lateral wall of the right middle fossa reaching the sphenoid wing and floor, 11.0 x 5.0 cm with the central area depressed (AIS-4)

Depressed skull fractures with brain tissue exposed involving the right temporal and parietal bones (8.0 x 3.5 cm), dura disrupted by jagged bone fragments depressed into the right lateral cerebral hemisphere (AIS-4)

Linear burst fracture of the left parietal bone extending from the sagital fissure with 4 mm of separation and an anterior branch into the coronal suture 2.8 cm (AIS-3)



INTERNAL/SOFT TISSUE

Massive brain swelling, weight of 805 grams (AIS-5)

Uncal and tonsillar herniation, bilaterally (AIS-5)

Right subdural hemorrhage (AIS-5)

Bilateral epidural hemorrhage (AIS-5)

Left subdural hemorrhage (AIS-4)

Brain laceration with fragmentation of lateral right temporal and frontal lobes (AIS-4)

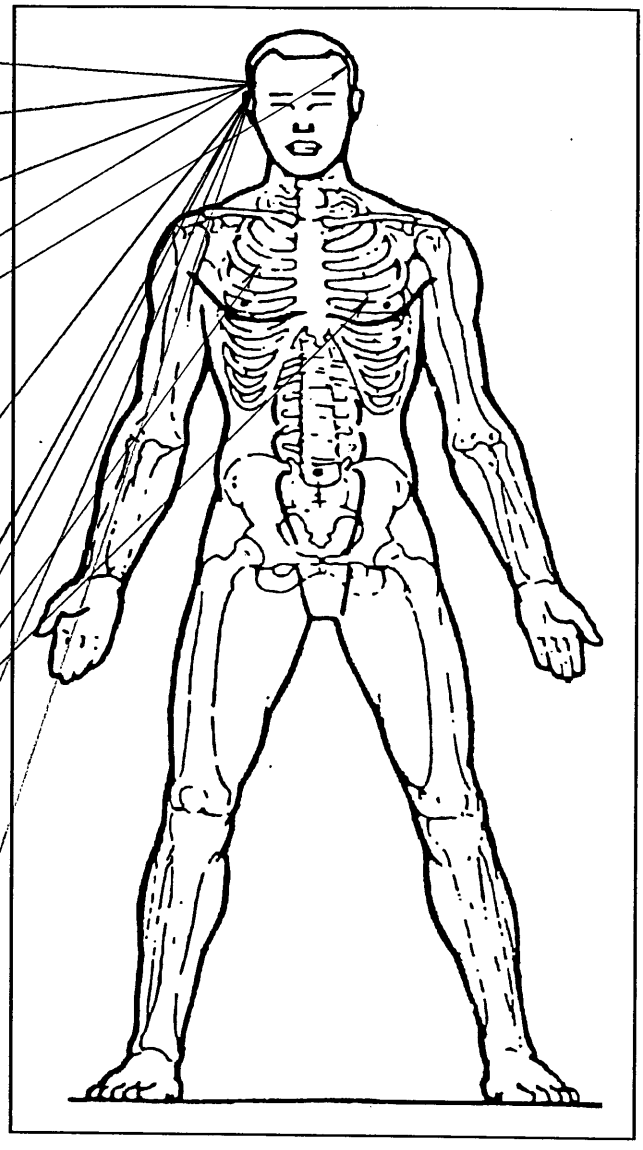
Thin film subarachnoid blood over entire brain (AIS-3)

Cerebellum swelling with hemorrhagic herniation of the tonsils (AIS-3)

Bilateral hemothorax (AIS-3)

Contusion hemorrhage in the dermis and subcutaneous tissues over the right scalp (AIS-1)

Multiple intracranial contusions throughout the left temporal and right occipital lobes (AIS-3)



ATTACHMENT D:

Saturn's Owner's Manual

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SUPPLEMENTAL INFLATABLE RESTRAINT SYSTEM — "AIR BAG"

This section explains the Supplemental Inflatable Restraint (SIR) or "Air Bag" system. Your Saturn has an air bag for the driver and for the right–front passenger. Here are the most important things to know:

⚠ CAUTION

An inflating air bag can seriously injure small children. Always secure children properly in your vehicle. To read how, see the heading "Children" in this section of the handbook, and read the caution label on the front–passenger's safety belt.

⚠ CAUTION

You can be severely injured or killed in a crash if you aren't wearing your safety belt – even if you have an air bag. Wearing your safety belt during a crash helps reduce your chance of hitting things inside the vehicle or being ejected from it. The air bag is only a "supplemental restraint". That is, it works with safety belts but doesn't replace them. Air bags are designed to work only in moderate to severe crashes where the front of your vehicle hits something. They aren't designed to inflate in rollover, rear, side, or low–speed frontal crashes. Everyone in your vehicle, including the driver, should wear a safety belt properly – whether or not there's an air bag for that person.

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⚠ CAUTION

For maximum safety protection in all types of crashes, you must wear your safety belt.

Do not install rearward–facing child seats in any front passenger seat position.

Do not sit or lean unnecessarily close to the air bag.

Do not place any objects over the air bag or between the air bag and yourself.

⚠ CAUTION

Air bags inflate with great force, faster than the blink of an eye. If you're too close to an inflating air bag, it could seriously injure you. Safety belts help keep you in position for air bag inflation in a crash. Always wear your safety belt, even with an air bag, and sit as far back as you can while still maintaining control of your vehicle.

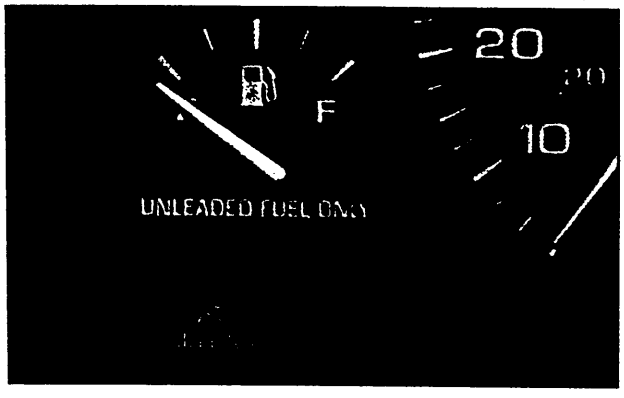
⚠ CAUTION

When an air bag inflates, there is dust in the air. This dust could cause breathing problems for people with a history of asthma or other breathing trouble. To avoid this, everyone in the vehicle should get out as soon as it is safe to do so. If you have breathing problems but can't get out of the vehicle after an air bag inflates, then get fresh air by opening a window or door.

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Air Bag Readiness Light

There is an air bag readiness light on the instrument panel which shows a driver or right–front passenger properly belted, with an inflated air bag labeled as "air bag". The system checks for electrical malfunctions, and the light tells you if there is a problem.



You will see the light flash for a few seconds when you turn your ignition to "RUN" or "START."

Then the light should go out, which means the system is ready.

Remember, if the air bag readiness light doesn't come on when you start your vehicle, or stays on, or comes on when you are driving, your air bag system may not work properly. Have your vehicle serviced right away.

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How the Air Bag System Works



Q: Where are the air bags?

A: The driver's air bag is in the middle of the steering wheel. The right–front passenger's air bag is located in the instrument panel on the passenger's side.



Q: When should an air bag inflate?

A: An air bag is designed to inflate in moderate to severe frontal or near–frontal crashes if the velocity of the impact is above the designed threshold level. When impacting straight into a wall that does not move or deform, the threshold level for Saturn vehicles is about 15 mph (24 km).

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This threshold velocity will be considerably higher if the vehicle strikes an object such as a parked car which will move and deform on impact. The air bags are also not designed to inflate in rollovers, side impacts, or rear impacts where the inflation would provide no occupant protection benefit.

In any particular crash, no one can say whether the air bag(s) should have inflated simply because of the damage to a vehicle or because of what the repair costs were. Inflation is determined by the angle of the impact and the vehicle's deceleration. Vehicle damage is only one indicator of this.

Air bags are designed **not** to inflate in a crash **unless** inflation would be likely to reduce the risk of serious injury. An air bag inflates with great speed and force, and is capable of causing injuries to occupants who are too close to it when it inflates. This is why an air bag is designed not to deploy in side, rear, and low–speed frontal crashes.

Q: What makes an air bag inflate?

A: In a frontal impact of sufficient severity, the air bag sensing system located on the vehicle will detect that the vehicle is suddenly stopping as a result of a crash. The sensing system completes an electrical circuit, triggering a chemical reaction of the sodium azide sealed in the inflators. The reaction produces nitrogen gas, which inflates the air bags. The inflators, air bags, and related hardware are all part of the air bag inflator modules packed inside the steering wheel and in the instrument panel in front of the right–front passenger.

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Q: How does an air bag restrain?

A: In moderate to severe frontal or near–frontal collisions, even belted occupants can contact the steering wheel or instrument panel. The air bags supplement the protection provided by safety belts. Air bags distribute the force of the impact more evenly over the occupant's upper body, stopping the occupant gradually. But, air bags would not provide protection in many types of collisions, including rollovers, rear, and side impacts, primarily because an occupant's motion is not toward the air bag. Air bags should never be regarded as anything more than a supplement to safety belt protection in these moderate to severe frontal and near–frontal collisions.

Q: What will you see after an air bag inflates?

A: After the air bags inflate, they quickly deflate. This occurs so quickly that some people may not even realize the air bags have inflated. Some components of the air bag module in the steering wheel hub for the driver's air bag, or the instrument panel for the right–front passenger's air bag will be hot for a short time, but the part of the bag that comes into contact with you will not be hot to the touch. There will be some smoke and dust coming from vents in the deflated air bags. Air bag inflation will not prevent the driver from seeing or from being able to steer the vehicle, nor will it stop people from leaving the vehicle. In many crashes severe enough to inflate an air bag, windshields are broken by vehicle deformation.

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- The air bags are designed to inflate only once. After they inflate, you'll need some new parts for your air bag system. If you don't get them, the air bag system won't be there to help protect you in another crash. A new system will include the air bag modules and possibly other parts. The Saturn Service Manual has information about the need to replace other parts.
- Your vehicle is equipped with a diagnostic module, which records information about the air bag system if the air bag deploys during a crash. The module records information about the readiness of the system, the change in velocity your vehicle has experienced, and the driver's safety belt usage at deployment.
- Let only qualified technicians work on your air bag system. Improper service can mean that your air bag system won't work properly. See your Saturn retailer for service.

NOTICE

If you damage the cover for the driver or right-front passengers air bag, it may not work properly. You may have to replace the air bag on the steering wheel or the right-front passengers air bag module. Do not open or break the air bag covers.

⚠ CAUTION

Don't put anything on, or attach anything to, the air bags. Also, don't put anything (such as pets or objects) between any occupant and the driver air bag or right-front passenger air bag. If something is between an occupant and an air bag, it could affect the performance of the air bag, or worse, it could cause injury.

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Servicing Your Saturn With the Air Bag System

Please tell or remind anyone who works on your Saturn that it has a dual air bag system. Air bags affect how your Saturn should be serviced. There are parts of the air bag system in several places around your vehicle. You don't want the system to inflate while someone is working on your car. The air bag system does not need regular maintenance. Your Saturn retailer and the 1995 Saturn Service Manual have information about the air bag system, including repair and disposal. To purchase a service manual set, see "Publications" in the Index.

⚠ CAUTION

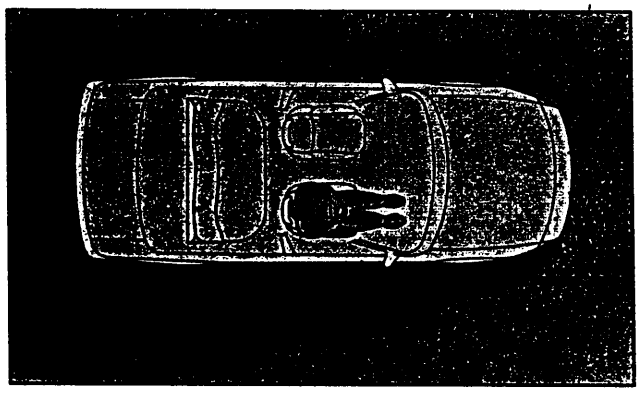
For up to 5 seconds after the ignition is turned off or the battery is disconnected, an air bag can still inflate during improper service. You can be injured if you are close to an air bag when it inflates. Avoid yellow connectors, they are probably part of the air bag system. Be sure to follow proper service procedures and make sure the person performing work for you is qualified to do so.

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Right Front Passenger Position

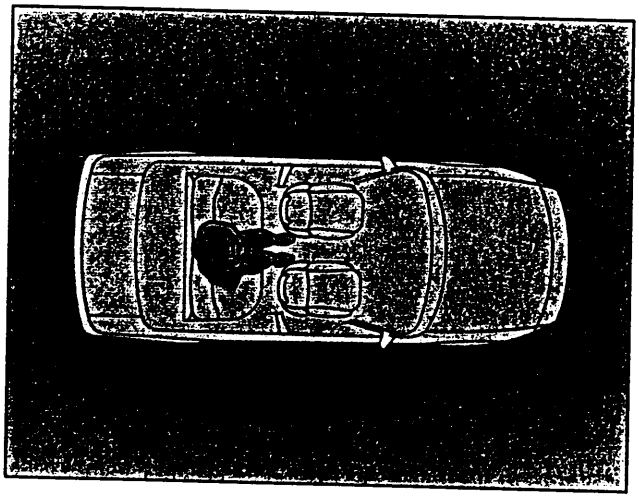
The right front passenger's safety belt works the same way as the driver's safety belt. See "Driver Position," earlier in this section.

When the lap portion of the belt is pulled out all the way, it will lock. If it does, let it go back all the way and start again.



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Center Passenger Position



If your vehicle has a rear bench seat, someone can sit in the center position.



When you sit in the center seating position, you have a lap safety belt, which has no retractor. To make the belt longer, tilt the latch plate and pull it along the belt.

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To make the belt shorter, pull its free end as shown until the belt is snug.



Buckle, position and release it the same way as a front seat lap belt. Make sure the release button on the buckle faces upward or outward so you would be able to unbuckle it quickly if you ever had to.

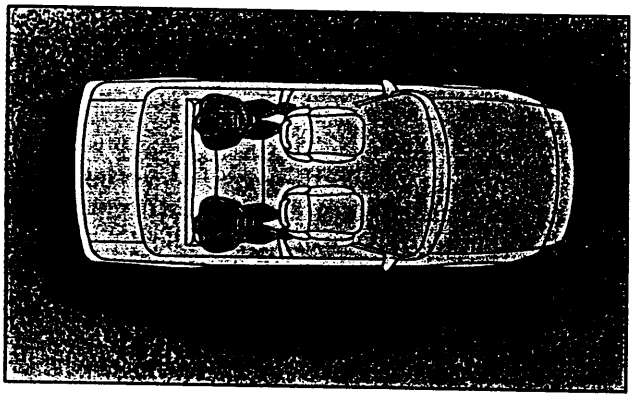
Rear Seat Passengers

It's very important for rear seat passengers to buckle up! Accident statistics show that unbelted people in the rear seat are hurt more often in crashes than those who are wearing safety belts.

Rear passengers who aren't wearing safety belts can be thrown out of the vehicle in a crash. And they can strike others in the vehicle who are wearing safety belts.

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Rear Seat Outside Passenger Positions



The positions next to the windows have lap-shoulder belts. Here's how to wear one properly.

1. Pick up the latch plate and pull it across you. Don't let it get twisted.

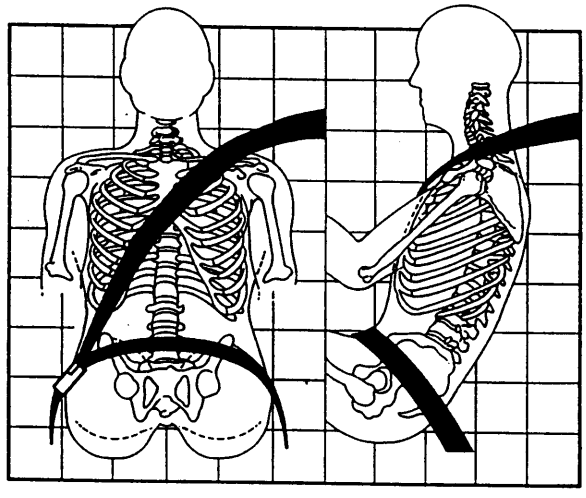


2. Push the latch plate into the buckle until it clicks. The rear lap-shoulder belt latch plate will not fit into the center buckle. This is designed for center passenger use only. If the belt stops before it reaches the buckle, tilt the latch plate and keep pulling until you can buckle it.

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Make sure the release button on the buckle faces upward or outward so you would be able to unbuckle it quickly if you ever had to.





3. To make the lap belt tight, pull down on the buckle end of the belt as you pull up on the shoulder part.

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The lap part of the belt should be low and snug below the hips, just touching the thighs. In a crash, this applies force to the strong pelvic bones. And you'd be less likely to slide under the lap belt. If you slid under it, the belt would apply force at your abdomen. This could cause serious or even fatal injuries. The shoulder belt should go over the shoulder and across the chest. These parts of the body are best able to take belt restraining forces. The safety belt locks only if there's a sudden stop or a crash.

⚠ CAUTION

You can be seriously hurt if your shoulder belt is too loose. In a crash you would move forward too much, which could increase injury. The shoulder belt should fit against your body.



4. To unlatch the belt, just push the button on the buckle.

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Safety Belt Use During Pregnancy

Safety belts work for everyone, including pregnant women. Like all occupants, they are more likely to be seriously injured if they don't wear safety belts. A pregnant woman should wear a lap-shoulder belt, and the lap portion should be worn as low as possible throughout the pregnancy.

The best way to protect the fetus is to protect the mother. When a safety belt is worn properly, it's more likely that the fetus won't be hurt in a crash. For pregnant women, as for anyone, the key to making safety belts effective is wearing them properly.



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Children

Everyone in a vehicle needs protection! That includes infants and all children smaller than adult size. In fact, the law in every state in the U.S. and in Canadian provinces says children up to some age must be restrained while in a vehicle.

Smaller Children and Babies

⚠ CAUTION

Smaller children and babies should always be restrained in a child or infant restraint. The instructions for the restraint will say whether it is the right type and size for your child. A very young child's hip bones are so small that a regular belt can't stay low on the hips, as it should. Instead, the belt will likely be over the child's abdomen. In a crash the belt would apply force right on the child's abdomen, which could cause serious or fatal injuries. So, be sure that any child small enough for one is always properly restrained in a child or infant restraint.

⚠ CAUTION

Never hold a baby in your arms while riding in a vehicle. A baby doesn't weigh much — until a crash. During a crash a baby will become so heavy you can't hold it. For example, in a crash at only 25 mph (40 km/h), a 12–pound (5.5 kg) baby will suddenly become a 240–pound (110 kg) force on your arms. The baby would be almost impossible to hold.

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⚠ CAUTION (Continued)



⚠ CAUTION (Continued)

Secure the baby in a rear−facing infant restraint only in the rear seat.



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CHILD RESTRAINTS

Be sure to follow the instructions for the restraint. You may find these instructions on the restraint itself or in a booklet, or both. These restraints use the belt system in your vehicle, but the child also has to be secured within the restraint to help reduce the chance of personal injury. The instructions that come with the infant or child restraint will show you how to do that.

Where to Put the Restraint

Accident statistics show that children are safer if they are restrained in the rear rather than the front seat. We recommend that you put your child restraint in the rear seat. Never put a rear–facing child restraint in the front passenger seat. Here's why:

⚠ CAUTION

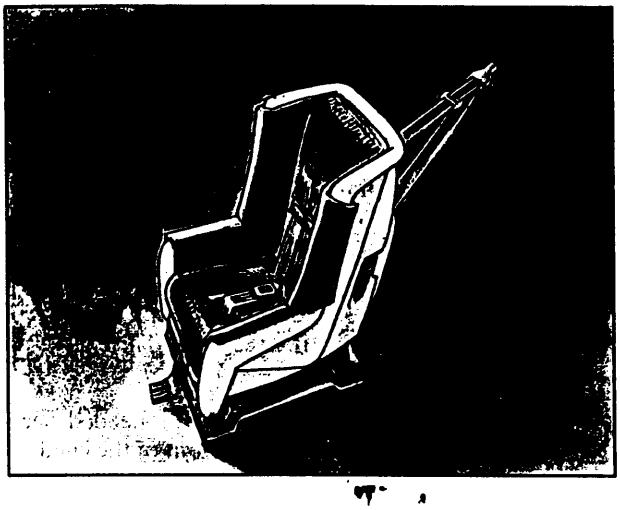
A child in a rear–facing child restraint can be seriously injured or killed if the right–front passenger's air bag inflates. This is because the back of a rear–facing child restraint would be very close to the inflating air bag. Always secure a rear–facing child restraint in the rear seat.
You may, however, secure a forward–facing child restraint in the right front seat. Before you secure a forward–facing child restraint, always move the front passenger seat as far back as it will go. Or, secure the child restraint in the rear seat.

Wherever you install it, be sure to secure the child restraint properly.

Keep in mind that an unsecured child restraint can move around in a collision or sudden stop and injure people in the vehicle. Be sure to properly secure any child restraint in your vehicle—even when no child is in it.

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Top Strap



If your child restraint has a top strap, it should be anchored.

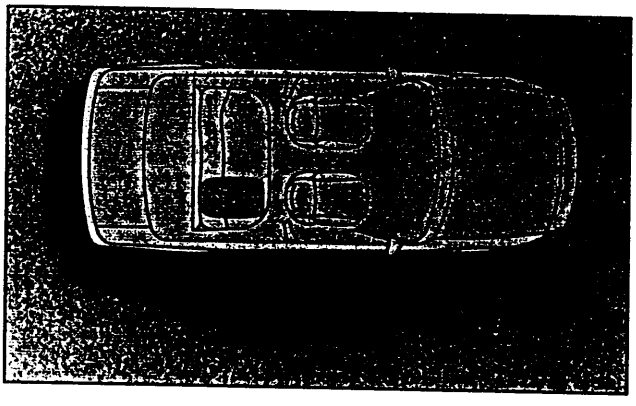
Your retailer can provide you with a child seat tether anchor kit that is specially designed to be used in conjunction with many infant or toddler seats.

If you need to have an anchor installed, you can ask your Saturn retailer to put it in for you. If you want to install an anchor yourself, your retailer can tell you how to do it.

For cars sold in Canada: Child restraints with a top strap must be anchored according to Canadian law. Your retailer can obtain the hardware kit and install it for you or you may install it yourself using the instructions provided in the kit. Please use the tether hardware kit available from your retailer as the hardware and installation instructions were specifically designed for this vehicle.

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Securing a Child Restraint in a Rear Outside Position



You'll be using the lap-shoulder belt. See the earlier section about the top strap if the child restraint has one.

1. Put the restraint on the seat. Follow the instructions for the child restraint.
2. Secure the child in the child restraint as the instructions say.
3. Pull out the vehicle's safety belt and run the lap part through or around the restraint. The child restraint instructions will show you how.
4. Tilt the latch plate to adjust the belt if needed. See if the shoulder belt would go in front of the child's face or neck. If so, put it behind the child restraint.

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5. Buckle the belt. Make sure the release button faces upward or outward, so you'll be able to unbuckle it quickly if you ever need to.

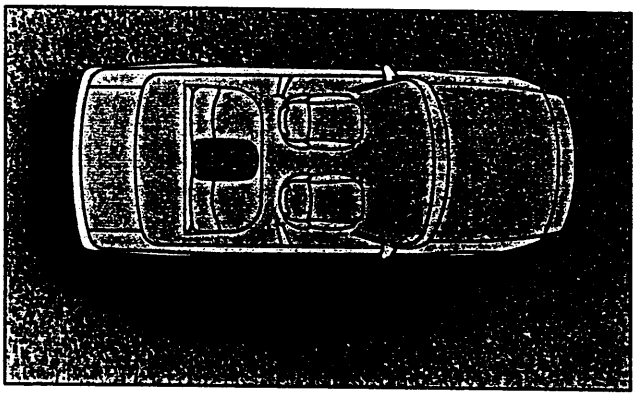


6. To tighten the belt, pull up on the shoulder belt while you push down on the child restraint.
7. Push and pull the child restraint in different directions to be sure it is secure.

To remove the child restraint, just unbuckle the vehicle's safety belt and let it go back all the way. The safety belt will move freely again and be ready to work for an adult or larger child passenger.

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Securing a Child Restraint in the Center Rear Seat Position



When you secure a child restraint in a center seating position, you'll be using the lap belt.

See the earlier section about the top strap if the child restraint has one.

1. Make the belt as long as possible by tilting the latch plate and pulling it along the belt.



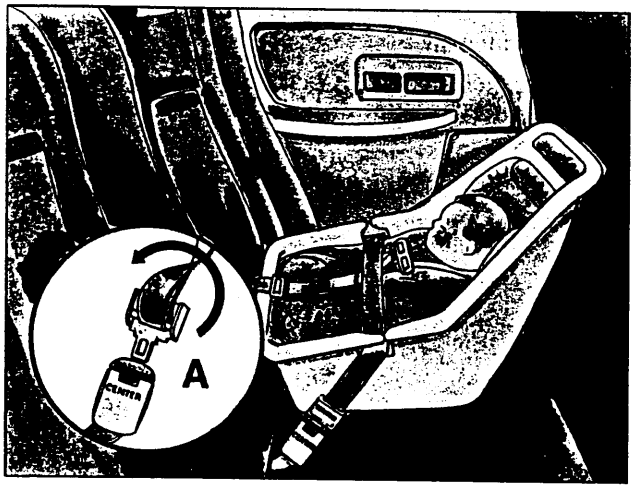
2. Put the restraint on the seat. Follow the instructions for the child restraint.

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3. Secure the child in the child restraint as the instructions say.
4. Run the vehicle's safety belt through or around the restraint. The child restraint instructions will show you how.
5. Buckle the belt. Make sure the release button faces upward or outward, so you'll be able to unbuckle it quickly if you ever need to.
6. To tighten the belt, pull its free end while you push down on the child restraint.

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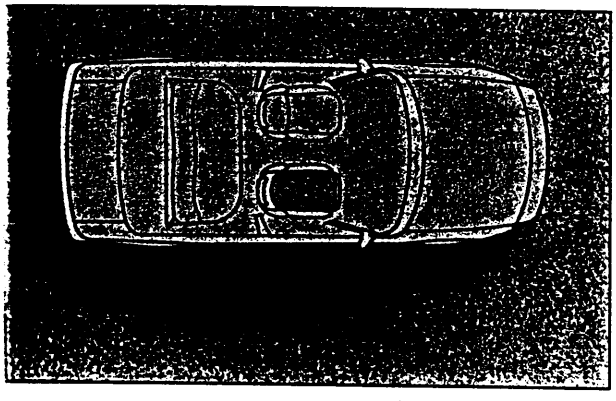


7. Push and pull the child restraint in different directions to be sure it is secure. If the child restraint isn't secure, tighten the belt, rotate the latch plate (A) and buckle it again as shown. Then see if it is secure. If it isn't, secure the restraint in a different place in the vehicle and contact the child restraint maker for their advice about how to attach the child restraint properly.

To remove the child restraint, just unbuckle the vehicle's safety belt. It will be ready to work for an adult or larger child passenger.

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Securing a Child Restraint in the Right Front Seat



Your vehicle has a right–front passenger's air bag. NEVER put a rear–facing child restraint in this seat.

Here's why:

> **⚠ CAUTION**
>
> **A child in a rear–facing child restraint can be seriously injured if the right–front passenger's air bag inflates. This is because the back of a rear–facing child restraint would be very close to the inflating air bag. Always secure a rear–facing child restraint in the rear seat. If a forward–facing child restraint is suitable for your child, always move the passenger seat as far back as it will go.**

You'll be using the manual seat belt. See the earlier section about the top strap if the child restraint has one.

1. Because your vehicle has a right–front passenger's air bag, always move the seat as far back as it will go before securing a front–facing child restraint.

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2. Put the restraint on the seat. Follow the instructions for the child restraint.
3. Secure the child in the child restraint as the instructions say.
4. Pick up the latch plate and run the lap and shoulder portions of the vehicle's safety belt through or around the restraint.

 The child restraint instructions will show you how.
5. Buckle the belt.

 Make sure the release button faces upward or outward, so you will be able to unbuckle it quickly if you ever need to.
6. Pull the rest of the lap belt all the way out of the retractor to set the lock.

⚠ CAUTION

For maximum safety protection in all types of crashes, you must wear your safety belt.

Do not install rearward-facing child seats in any front passenger seat position.

Do not sit or lean unnecessarily close to the air bag.

Do not place any objects over the air bag or between the air bag and yourself.

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7. To tighten the belt, feed it back into the retractor while you push down on the child restraint.
8. Push and pull the child restraint in different directions to be sure it is secure.

To remove the child restraint, unbuckle the vehicle's safety belt and let it go back all the way. The safety belt will move freely again and be ready to work for an adult or larger child passenger.

Larger Children



Children who have outgrown child restraints should wear the vehicle's safety belts. If you have the choice, a child should sit next to a window so the child can wear a lap-shoulder belt and get the additional restraint a shoulder belt can provide. Accident statistics show that children are safer if they are restrained in the rear seat. But they need to use the safety belts properly.

Children who aren't buckled up can be thrown out of the car in a crash, or strike other people in the vehicle who are buckled up.

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⚠ CAUTION

Never do this.



⚠ CAUTION (Continued)

Here two children are wearing the same belt. The belt can't properly spread the impact forces. In a crash, the two children can be crushed together and seriously injured. A belt must be used by only one person at a time.

Q: What if a child is wearing a lap-shoulder belt, but the child is so small that the shoulder belt is very close to the child's face or neck?

A: Move the child toward the center of the vehicle, but be sure that the shoulder belt still is on the child's shoulder, so that in a crash the child's upper body would have the restraint that belts provide. If the child is so small that the shoulder belt is still very close to the child's face or neck, you might want to place the child in a seat that has a lap belt only, if your vehicle has one.

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⚠ CAUTION

Never do this.



⚠ CAUTION (Continued)

Here is a child sitting in a seat that has a lap-shoulder belt, but the shoulder part is behind the child. If the child wears the belt in this way, in a crash the child might slide under the belt. The belt's force would then be applied right on the child's abdomen. That could cause serious or fatal injuries.

Wherever the child sits, the lap portion of the belt should be worn low, snug below the hips, and just touching the child's thighs. This applies belt force to the child's pelvic bones in a crash.

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CHECKING YOUR RESTRAINT SYSTEMS

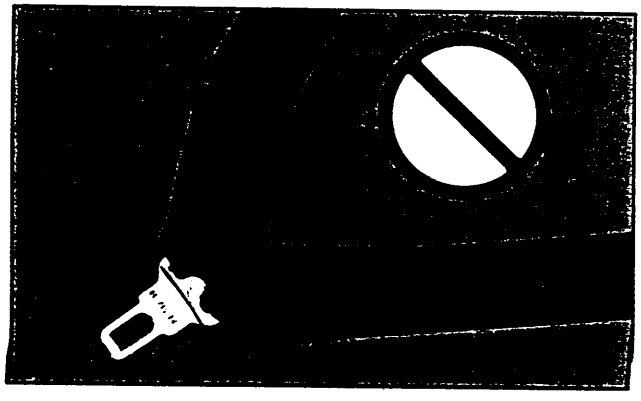
Now and then, make sure all your belts, buckles, latch plates, retractors, anchorages and warning systems are working properly. Look for any loose parts or damage. If you see anything that might keep a restraint system from doing its job, have it repaired.

Torn or frayed belts may not protect you in a crash. They can rip apart under impact forces. If a belt is torn or frayed, get a new one right away.

REPLACING SEAT AND RESTRAINT SYSTEM PARTS AFTER A CRASH

If you've had a crash, do you need new belts?

After a very minor collision, nothing may be necessary. But if the belts were stretched as they would be if worn during a more severe crash, then you need new belts.



If belts are cut or damaged, replace them. Collision damage also may mean you will have to have safety belt parts, like the retractor, replaced or anchorage locations repaired — even if the belt wasn't being used at the time of the collision.

If your seat adjuster won't work after a crash, inspect it for damage, and replace if necessary.